# TAXONOMIC REVISION OF THE NEOTROPICAL SPECIES OF *ELAPHOGLOSSUM* SECT. *SQUAMIPEDIA* (DRYOPTERIDACEAE)[1]

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## ABSTRACT

Taxonomic keys, illustrations, descriptions, synonymy, distribution maps, and an index to collectors' names and numbers are given for the Neotropical taxa belonging to *Elaphoglossum* Schott ex J. Sm. sect. *Squamipedia* Mickel & Atehortúa. Eighteen taxa are recognized herein, consisting of 16 species, with one of the species, *E. peltatum* (Sw.) Urb., having three forms. Three new species are described: *E. anthracinum* A. Vasco, Mickel & R. C. Moran, *E. blepharis* A. Vasco, Mickel & R. C. Moran, and *E. rhomboideum* A. Vasco, Mickel & R. C. Moran. The following name is lectotypified: *Acrostichum flabellatum* Humb. & Bonpl. ex Willd. var. *sphenophyllum* Kunze. Four species are atypical in the genus by having divided laminae: *E. colombianum* (Maxon) Mickel and *E. moorei* (E. Britton) Christ have pinnately divided laminae, *E. peltatum* (Sw.) Urb. has isodichotomously divided laminae, and *E. tripartitum* (Hook. & Grev.) Mickel has ternately divided laminae. The Neotropical species of the section can usually be distinguished from other species of *Elaphoglossum* by long-creeping, green rhizomes; thin, translucent, light orange or brown rhizome scales; distichous leaves; paired peglike aerophores on each side of the rhizome slightly proximal to the petiole bases; a lack of phyllopodia; leaves that are typically < 15 cm long; and echinulate spores. One species, *E. nidiforme* Mickel, is atypical by its large size and short-creeping rhizomes but is included here in *Elaphoglossum* sect. *Squamipedia* based on previous molecular phylogenetic analyses. All Neotropical species of *Elaphoglossum* sect. *Squamipedia* are epiphytes, usually in middle- to high-elevation forests. The section is most diverse in the Andes from Colombia to Bolivia, where 17 taxa occur.

## RESUMEN

Se presentan una clave, ilustraciones, descripciones, sinonimia, mapas de distribución y un índice de colectores por apellidos y números de colección para los taxones neotropicales pertenecientes a *Elaphoglossum* Schott ex J. Sm. sección *Squamipedia* Mickel & Atehortúa. De esta sección se reconocen 18 taxones que representan 16 especies. Dentro de una de las especies *E. peltatum* (Sw.) Urb., se reconocen tres formas. Se describen tres nuevas especies: *E. anthracinum* A. Vasco, Mickel & R. C. Moran, *E. blepharis* A. Vasco, Mickel & R. C. Moran y *E. rhomboideum* A. Vasco, Mickel & R. C. Moran. Se lectotipifica el nombre *Acrostichum flabellatum* Humb. & Bonpl. ex Willd. var. *sphenophyllum* Kunze. Cuatro de las especies dentro de la sección son atípicas en el género por tener láminas divididas: *E. colombianum* (Maxon) Mickel y *E. moorei* (E. Britton) Christ las tienen pinnadamente divididas, *E. peltatum* (Sw.) Urb. dicotómicamente divididas y *E. tripartitum* (Hook. & Grev.) Mickel ternadamente divididas. Las especies neotropicales de la sección usualmente pueden distinguirse de otras especies de *Elaphoglossum* por sus rizomas verdes largamente rastreros, escamas del rizoma delgadas y translucidas de color pajizo, marrón o naranja claro, hojas dísticas, aeróforos en forma de gancho a cada lado del rizoma casi proximales a la base del peciolo, filopodios ausentes, hojas típicamente menores a los 15 cm de largo y esporas equinuladas. Una especie, *E. nidiforme* Mickel, presenta una morfología atípica con hojas bastantes más largas y rizomas cortamente rastreros, sin embargo es incluida en el presente trabajo debido a que los análisis filogenéticos moleculares la ubican dentro de *Elaphoglossum* sección *Squamipedia*. Todas las especies neotropicales de *Elaphoglossum* sección *Squamipedia* son epífitas usualmente en bosques montanos o montano-altos. La sección es más diversa en los Andes, desde Colombia hasta Bolivia, en donde puenden encontrarse 17 taxones.

*Key words:* Dryopteridaceae, *Elaphoglossum*, IUCN Red List, Neotropics.

*Elaphoglossum* Schott ex J. Sm. is one of the world's largest fern genera, containing ca. 600 species, probably ca. 100 of which remain undescribed. It is a member of the Dryopteridaceae (Smith et al., 2006), and within that family belongs to the bolbitidoid clade characterized by creeping rhizomes,

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elongate (as seen in cross section) ventral meristeles, a lack of hairs, sterile-fertile leaf dimorphy, and acrostichoid sori (Moran et al., 2010a, 2010b). Its sister genus is *Mickelia* R. C. Moran, Labiak & Sundue (Moran et al., 2010a, 2010b). Unlike other species-rich fern genera, *Elaphoglossum* is relatively uniform morphologically. Nearly all of its species have simple, entire laminae and free veins. Most of the characters used to distinguish the species are based on the scales of the rhizomes and leaves, the shape of the laminae, and the presence or absence of hydathodes and phyllopodia (Mickel & Atehortúa, 1980). We estimate that ca. 80% of the species are epiphytes.

The present paper is one in a series of monographs for clades within *Elaphoglossum* (Vasco et al., 2009a, 2009b; Vasco, 2011) and floristic treatments for large geographical areas (Mickel & Beitel, 1988; Mickel, 1991, 1995a, 1995b; Mickel & Smith, 2004). We present a taxonomic revision of the 18 Neotropical taxa that we assign to *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa (Appendix 1). This section was first recognized by Mickel and Atehortúa (1980). Subsequently, the monophyly of the section has been supported by noncoding chloroplast DNA sequences (Rouhan et al., 2004; Skog et al., 2004). The morphological synapomorphies supporting the monophyly of the section are the absence of phyllopodia (Mickel & Atehortúa, 1980) and echinulate spores (Moran et al., 2007). Other morphological characteristics that are uniform or nearly so within the section, but are apparently plesiomorphic, are long-creeping rhizomes, paired peglike aerophores (Figs. 3B, 8B), and 2-ranked leaves (Mickel & Atehortúa, 1980).

Another possible synapomorphy for *Elaphoglossum* sect. *Squamipedia* might be the chromosome number. Wagner (1980) found that one species of the section, *E. peltatum* (Sw.) Urb. f. *peltatum*, had $x = 40$, not $x = 41$ as in the rest of the genus and for dryopteroid ferns in general (Smith et al., 2006). Wagner's count is the only one available for the section. It has been confirmed by a count of another individual of *E. peltatum* f. *peltatum* collected at La Selva Biological Station in Costa Rica (Fernando Matos, pers. comm.). Whether $x = 40$ is constant within *Elaphoglossum* sect. *Squamipedia* needs further investigation.

Gametophytes might also exhibit another synapomorphy for the section. Stokey and Atkinson (1957) examined the gametophytes of two species of *Elaphoglossum* sect. *Squamipedia* (*E. peltatum* f. *peltatum* and *E. tripartitum* (Hook. & Grev.) Mickel [*Bell 662*, COL]) and 18 species from *Elaphoglossum* sections *Elaphoglossum*, *Lepidoglossa* Christ, and *Setosa* (Christ) Mickel & Atehortúa. All the gametophytes developed slowly and when mature were long, narrow, ribbon shaped, and beset with marginal rhizoids. This morphology was later corroborated by Chiou et al. (1998) for other members of the genus. All of the species examined by Stokey and Atkinson (1957) bore 1-celled papillate hairs with waxy caps except for the two species of *Elaphoglossum* sect. *Squamipedia* examined, which lacked such hairs entirely. We can confirm this with a form of *Elaphoglossum* sect. *Squamipedia* (*E. peltatum* f. *peltatum*) that we grew from spores. Thus, the absence of papillate hairs may be a synapomorphy for *Elaphoglossum* sect. *Squamipedia*, but more species in the section should be examined to verify this.

Within *Elaphoglossum*, a genus composed almost entirely of species with simple and entire laminae, *Elaphoglossum* sect. *Squamipedia* is of special interest because four of its species have dissected laminae (see next paragraph). Elsewhere in the genus, dissected laminae occur in only two species belonging to two sections: *E. bifurcatum* (Jacq.) Mickel, belonging to *Elaphoglossum* sect. *Lepidoglossa* (Vasco et al., 2009a, 2009b), and *E. cardenasii* W. H. Wagner, which belongs to *Elaphoglossum* sect. *Setosa* (Wagner, 1954; Mickel & Atehortúa, 1980; Rouhan et al., 2004, 2007). The species of *Elaphoglossum* with dissected laminae have sometimes been classified in segregate genera, namely *Microstaphyla* C. Presl, *Peltapteris* Link, and *Rhipidopteris* Schott ex Fée nom superfl. (Morton, 1955; Gómez, 1975; Mickel, 1995a). Because these segregates are nested within *Elaphoglossum* (Rouhan et al., 2004, 2007; Vasco et al., 2009b), they are no longer recognized because doing so would leave *Elaphoglossum* paraphyletic.

Within *Elaphoglossum* sect. *Squamipedia* there are three different patterns of laminar division. First, a dichotomous pattern is found in *E. peltatum* f. *peltatum* and *E. peltatum* f. *standleyi* (Maxon) Mickel, where the lamina bifurcates at the apex of the petiole to form two equal lamina halves. Any subsequent divisions of the two lamina halves—there may be up to seven divisions—are also dichotomous. Second, a pinnate plan, found in *E. colombianum* (Maxon) Mickel and *E. moorei* (E. Britton) Christ, has the rachis as a straight extension of the petiole (i.e., the petiole is not bifurcated at the apex) and five to 17 pairs of lateral pinnae borne along the rachis. Finally, there is a ternate plan, as in *E. tripartitum*, where the petiole and rachis form one continuous axis (i.e., the petiole is not bifurcated at the apex) and the lamina divides into three equal parts: two lateral pinnae and a central terminal portion. Our unpublished molecular phylogenetic results using three chloroplast markers (Vasco et al., in prep.) have found that the

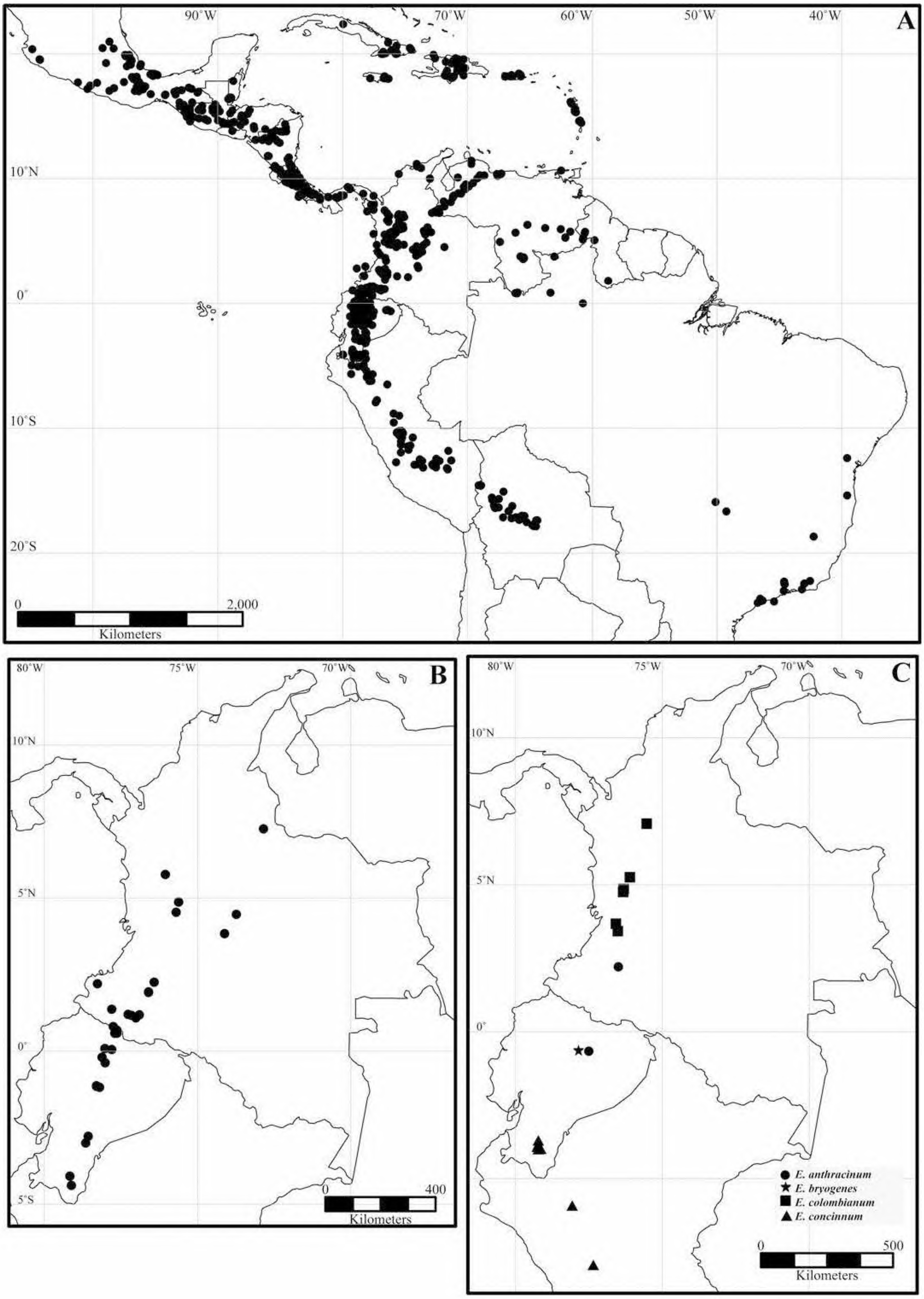

Figure 1. Distribution maps. —A. An overview of *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa in the New World. —B. *Elaphoglossum andreanum* Christ. —C. *Elaphoglossum anthracinum* A. Vasco, Mickel & R. C. Moran (●), *Elaphoglossum bryogenes* Mickel (★), *Elaphoglossum colombianum* (Maxon) Mickel (■), and *E. concinnum* Mickel (▲).

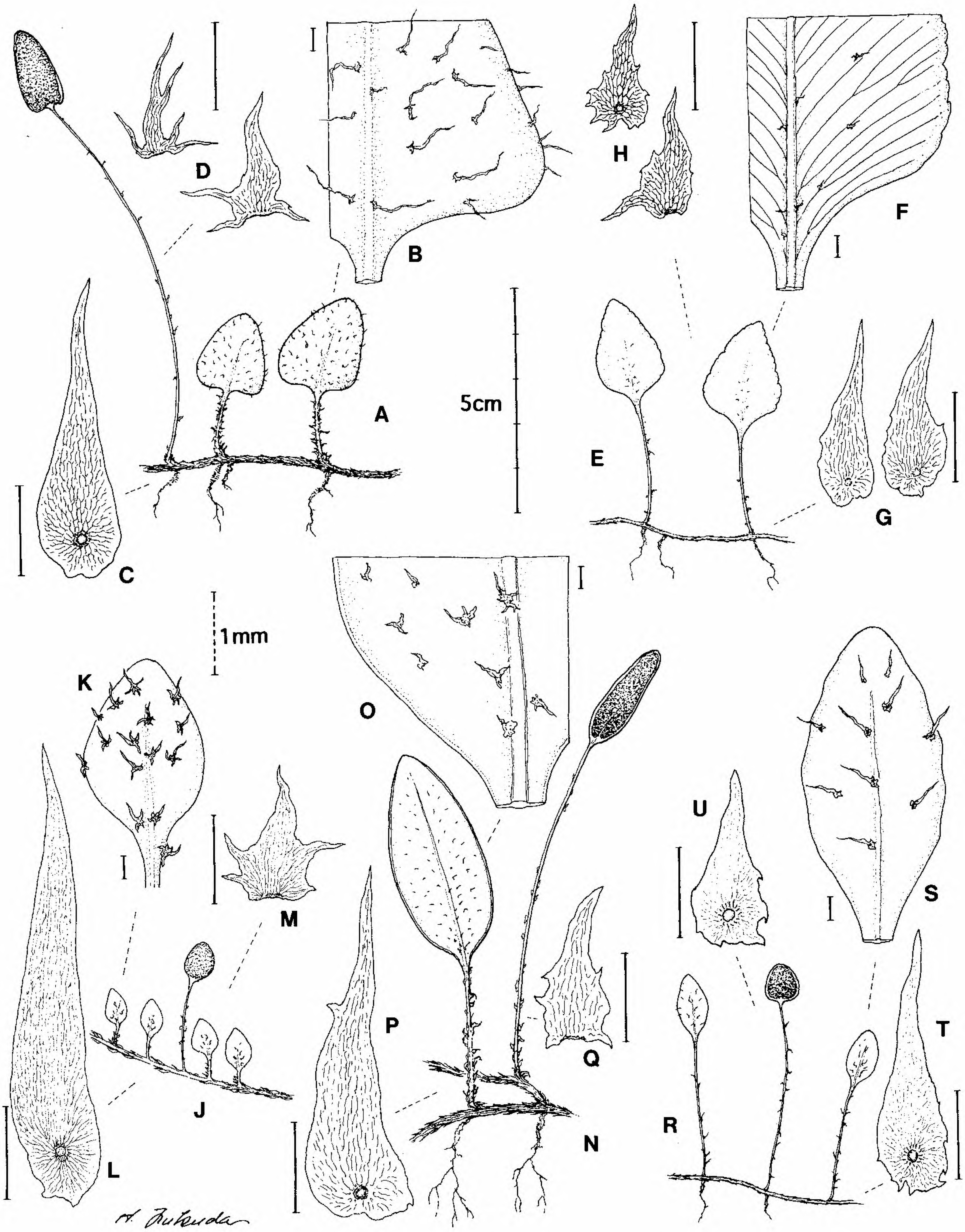

Figure 2. A–D. *Elaphoglossum blepharis* A. Vasco, Mickel & R. C. Moran. —A. Habit, with fertile leaf at left, two sterile at right. —B. Adaxial lamina detail. —C. Rhizome scale. —D. Petiolar scales. E–H. Juvenile leaves of *E. lloense* (Hook.) T. Moore. —E. Habit. —F. Abaxial lamina detail. —G. Rhizome scales. —H. Petiolar scales. J–M. *Elaphoglossum bryogenes* Mickel. —J. Habit, with five leaves, the dimorphic fertile one at center. —K. Adaxial lamina detail. —L. Rhizome scale. —M. Petiolar scale. N–Q. *Elaphoglossum squamipes* (Hook.) T. Moore. —N. Habit, sterile leaf to left, fertile to right. —O. Adaxial lamina detail. —P. Rhizome scale. —Q. Petiolar scale. R–U. *Elaphoglossum concinnum* Mickel. —R. Habit, fertile leaf at center. —S. Adaxial lamina detail. —T. Rhizome scale. —U. Petiolar scale. A–D from *Harling & Andersson 18092* (AAU); E–H from *Hoover et al. 2897* (MO); J–M from *Luteyn & Sylva 14682* (NY); N–Q from *Brade 5290* (NY); R–U from the holotype *Young 1301* (NY). All habit illustrations conform to the 5-cm scale bar; all other scale bars equal 1 mm.

four species of *Elaphoglossum* sect. *Squamipedia* with divided laminae are not monophyletic; instead they have had independent origins from ancestors with simple, entire laminae.

The original circumscription of *Elaphoglossum* sect. *Squamipedia* by Mickel and Atehortúa (1980) has been modified as a result of molecular phylogenetic studies. Rouhan et al. (2004) found that *E. ovatum* (Hook. & Grev.) T. Moore, originally assigned to the section by Mickel and Atehortúa (1980), belongs to *Elaphoglossum* sect. *Lepidoglossa*. Rouhan et al. (2007) also found that two species endemic to Madagascar, *E. marojejyense* Tardieu and *E. nidusoides* Rouhan & Rakotondr., are sister to the Neotropical species of *Elaphoglossum* sect. *Squamipedia*. The two Madagascan species were considered by Rouhan et al. (2004, 2007) to belong to *Elaphoglossum* sect. *Squamipedia*. Both species, however, differ morphologically in certain respects from the Neotropical species. *Elaphoglossum marojejyense* resembles the Neotropical species in its creeping rhizomes, distichous leaves, small size, and the presence of paired aerophores; however, it differs by perispores lacking many small spines, as found in Neotropical members of the section (Moran et al., 2007). Similarly, the second species, *E. nidusoides*, is aberrant morphologically in *Elaphoglossum* sect. *Squamipedia*. It appears to be a typical member of *Elaphoglossum* sect. *Elaphoglossum* by its compact rhizomes, presence of phyllopodia, larger leaves, near or total lack of laminar scales, and cristate perispores (Rouhan et al., 2007). Besides these two Madagascan endemics, Rouhan et al. (2007) also found that an Andean species, *E. nidiforme* Mickel, was nested in the section. The species resembles *E. nidusoides* from Madagascar and, similarly, is atypical morphologically in *Elaphoglossum* sect. *Squamipedia*. It more closely resembles species of *Elaphoglossum* sect. *Elaphoglossum* in its large leaves, short-creeping rhizomes, and presence of phyllopodia (it is the only Neotropical member of *Elaphoglossum* sect. *Squamipedia* that has phyllopodia). However, we have found that its spores are like those of Neotropical members of *Elaphoglossum* sect. *Squamipedia*, having echinulate perispores. In our present treatment of *Elaphoglossum* sect. *Squamipedia*, *E. nidiforme* is included on the basis of molecular evidence (Vasco et al., in prep.), even though it seems atypical morphologically.

Besides the study by Rouhan et al. (2007), our own molecular phylogenetic study (Vasco et al., in prep.) has found that *Elaphoglossum wrightii* (Mett. ex D. C. Eaton) T. Moore, a species originally placed in the section by Mickel and Atehortúa (1980), does not belong to *Elaphoglossum* sect. *Squamipedia* and is accordingly excluded from the section (see Excluded Species).

## MATERIALS AND METHODS

This study is based on an examination of over 3000 herbarium sheets representing ca. 1300 individual collections from 27 herbaria (see footnote first page). For most of the specimens, geographic coordinates were estimated using geographical gazetteers because this information was often not provided on the labels. These estimated coordinates were used to compose the distribution maps for the species and are given in brackets for type and paratype specimens cited below. Illustrations and silhouette images were prepared from herbarium specimens.

Available at the *Elaphoglossum* pages at <http://sweetgum.nybg.org/elaphoglossum/index.php> are the descriptions and discussions for the species included in this monograph. Also available at the web site is information on all specimens examined (also available from the author upon request), photographs of all types and of selected specimens, copies of all protologues, and additional photographs. A list of all names, both accepted and synonyms, are listed in Appendix 2. A list of all specimens examined, with collectors' names and numbers, is given in Appendix 3.

## TAXONOMIC TREATMENT

I. **Elaphoglossum** sect. **Squamipedia** Mickel & Atehortúa, Amer. Fern J. 70: 57. 1980. TYPE: *Acrostichum squamipes* Hook. [≡ *Elaphoglossum squamipes* (Hook.) T. Moore]. Figure 1A.

*Peltapteris* Link, Fil. Spec. 147. 1841. *Elaphoglossum* subsect. *Peltapteris* (Link) Mickel & Atehortúa [in *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa], Amer. Fern J. 70: 59. 1980. TYPE: *Osmunda peltata* Sw. [≡ *Elaphoglossum peltatum* (Sw.) Urb. f. *peltatum*].

*Rhipidopteris* Schott ex Fée, Mem. Foug. [Hist. Acrost.] 2: 14. 1845, nom. superfl. for *Peltapteris* and with the same type [see Morton, 1955]. TYPE: *Acrostichum peltatum* (Sw.) Sw. [≡ *Elaphoglossum peltatum* (Sw.) Urb.]

*Elaphoglossum* subsect. *Feeana* Christ [in *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa], Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 60. 1899. TYPE: *Acrostichum feei* Bory ex Fée [≡ *Elaphoglossum feei* (Bory ex Fée) T. Moore].

Rhizomes typically 1–1.5 mm wide (to 10 mm wide in *Elaphoglossum nidiforme*), slender, long-creeping or (in *E. nidiforme*) short-creeping to compact;

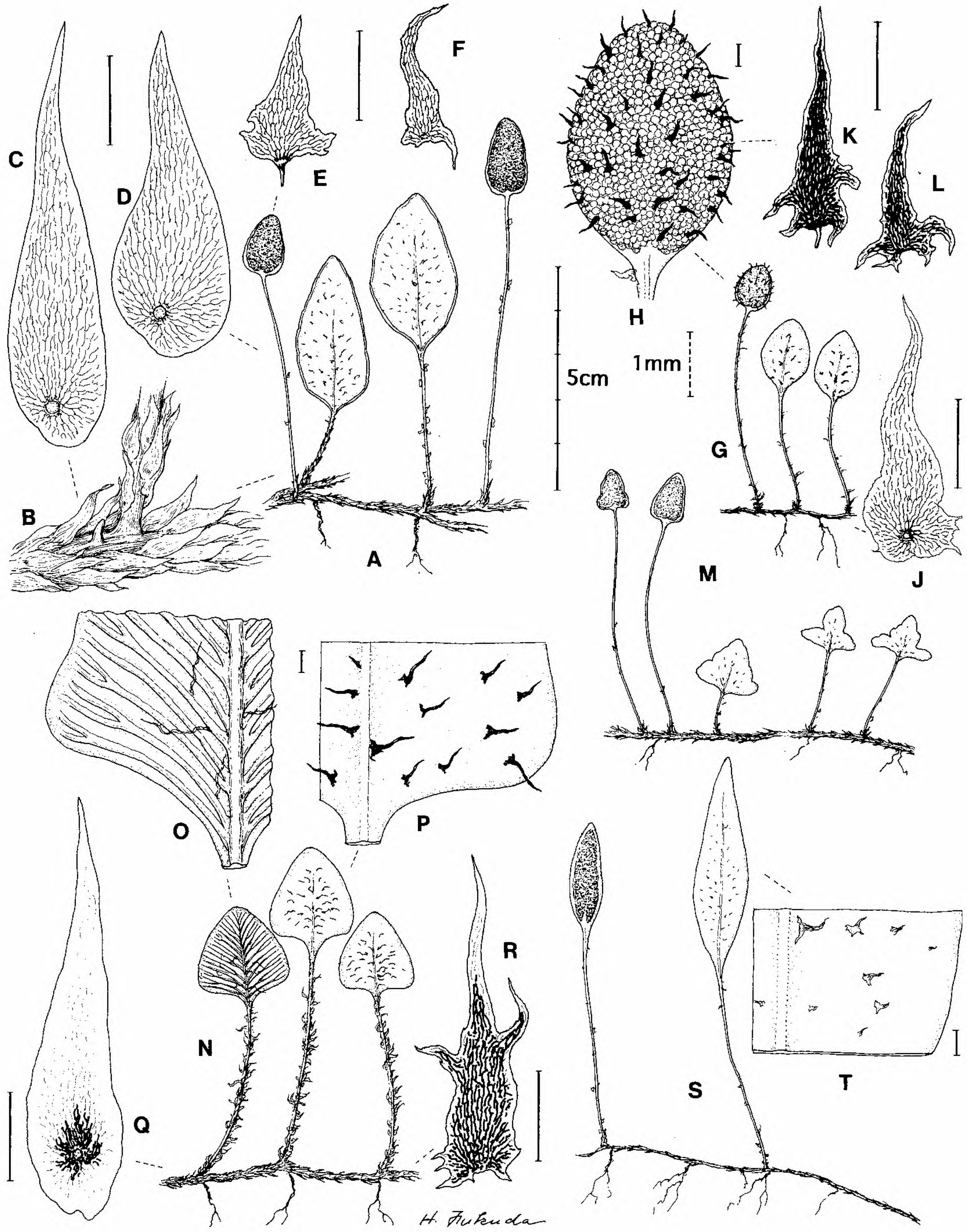

Figure 3. A–F. *Elaphoglossum squamipes* (Hook.) T. Moore. —A. Habit, with two sterile leaves at center, fertile left and right. —B. Rhizome detail with aerophore. —C. Rhizome scale. —D. Petiolar scale. —E. Intersporangial scale. —F. Laminar scale. G–L. *Elaphoglossum concinnum* Mickel. —G. Habit, fertile leaf at left. —H. Fertile lamina detail. —J. Rhizome scale. —K, L. Fertile laminar scales. —M. *Elaphoglossum deltoideum* (Sodiro) Christ. Habit, with two fertile leaves at left, three sterile at right. N–R. *Elaphoglossum anthracinum* A. Vasco, Mickel & R. C. Moran. —N. Habit, all leaves are sterile. —O. Abaxial lamina detail. —P. Adaxial lamina detail. —Q. Rhizome scale. —R. Petiolar scale. S, T. *Elaphoglossum lloense* (Hook.) T. Moore. —S. Habit, with fertile leaf at left. —T. Abaxial lamina detail. A–F from *Breedlove 22733* (NY); G–L from *van der Werff & Palacios 9054* (MO); M from *Holm-Nielsen & Jeppesen 1365* (AAU); N–R from the holotype, *Luteyn & Cotton 11002* (NY); S, T from *Øllgaard & Navarrete 2700* (AAU). All habit illustrations conform to the 5-cm scale bar; all other scale bars equal 1 mm.

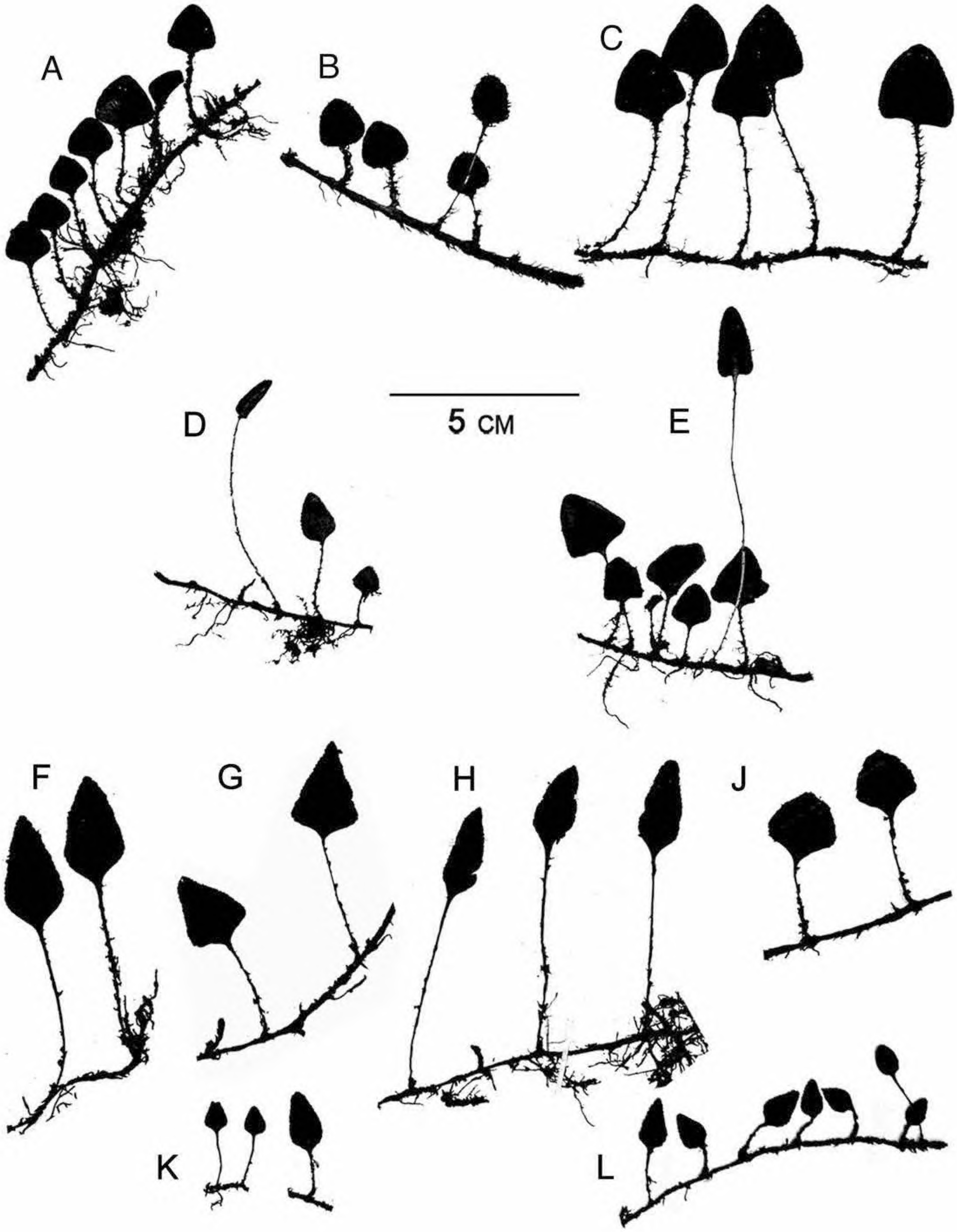

Figure 4. Silhouettes of three species of *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa. A–C. *Elaphoglossum anthracinum* A. Vasco, Mickel & R. C. Moran. D, E. *Elaphoglossum blepharis* A. Vasco, Mickel & R. C. Moran. F–L. *Elaphoglossum andreanum* Christ. A from *Luteyn & Cotton 11002* (MO); B from *Lozano 3489* (COL); C from *Luteyn & Cotton 11002* (NY); D from *Harling & Andersson 22455* (AAU); E from *Harling & Andersson 18092* (AAU); F from *Velez et al. 4206* (COL); G from *van der Werff & Palacios 10621* (MO); H from *Jaramillo et al. 5973* (COL); J from *Lozano et al. 4684* (COL); K from *Moran 6867* (NY); L from *André 3114* (NY).

rhizome scales narrowly lanceolate to ovate, light orange to brown, sometimes darkened at point of attachment; aerophores paired, peglike, ca. 1 mm tall, whitish to yellowish or greenish, borne on the rhizome about 1–2 mm proximal to the petiole base, one on each side of the petiole base (absent in *E. nidiforme*). Sterile leaves generally < 15 cm long (to 30–37 cm long in *E. nidiforme*), distichous, alternate, distant; petiolar scales ovate to lanceolate, peltate, hastate; phyllopodia generally absent; laminar scales often hastate with 1 to several basal processes or projections; veins free, simple or once-forked; hydathodes lacking. Perispores echinulate, with broad continuous folds or ridges. Chromosome number: $x = 40$ (Wagner, 1980).

*Distribution.* *Elaphoglossum* sect. *Squamipedia* is most diverse in the Andes from Colombia to Bolivia, where 17 taxa occur. Three taxa occur in Mexico, five in Central America, three in the Antilles, and two in the coastal mountains of southeastern Brazil (Appendix 4).

### KEY TO THE NEOTROPICAL SPECIES OF *ELAPHOGLOSSUM* SECT. *SQUAMIPEDIA*

Note: Leaf measurements were taken from the largest leaf on each herbarium sheet. Examples of our definitions of lamina shape: deltate (Fig. 4C), deltate-hastate (Fig. 5L), elongate deltate (Fig. 4F), elliptic (Fig. 10E), rhomboid (Fig. 5G).

1. Rhizomes compact; sterile leaves 30–37 × 4–5 cm; phyllopodia present .......... *E. nidiforme*

1′. Rhizomes long-creeping; sterile leaves 1–15(–27.5) × 0.5–3(–4) cm; phyllopodia absent .......... 2

2. Sterile laminae divided .......... 3

3. Sterile laminae dichotomously divided (divided at the apex of the petiole into 2 equal parts) .......... 4

4. Sterile laminae divided 1 or 2 times .......... *E. peltatum* f. *flabellatum*

4′. Sterile laminae divided 3 to 7 times .......... *E. peltatum* f. *peltatum*

3′. Sterile laminae pinnately divided .......... 5

5. Sterile laminae ternate or biternate; northwestern Ecuador .......... *E. tripartitum*

5′. Sterile laminae pinnate with 5 to 17 pairs of pinnae; Colombia, Peru, Bolivia .......... 6

6. Pinna pairs 5 to 9; pinna bases 1–2 mm wide; western Colombia .......... *E. colombianum*

6′. Pinna pairs 8 to 17; pinna bases 0.4–1 mm wide; Peru, Bolivia .......... *E. moorei*

2′. Sterile laminae simple .......... 7

7. Sterile laminae 0.3–0.8 cm wide, very narrowly elliptic, crenate; Lesser Antilles (Dominica, Guadeloupe) .......... *E. feei*

7′. Sterile laminae 0.4–4 cm wide, broadly deltate or ovate to rhombic, lanceolate, oblanceolate or elliptic, entire or minutely crenulate; Greater Antilles (Cuba, Jamaica, Dominican Republic), Mexico, Central America, South America .......... 8

8. Sterile laminae (3)5–27.5 cm long, (1.8 to)3 to 14 times longer than wide, ovate-lanceolate, elliptic or oblong .......... 9

9. Sterile lamina apices attenuate, acute to acuminate .......... *E. lloense*

9′. Sterile lamina apices obtuse to broadly acute .......... 10

10. Sterile laminae (3 to)4 to 11 times longer than wide, narrowly elliptic to oblong, usually widest at or above the middle, often parallel-sided medially; at elevations from 100 to 1000(1700) m .......... *E. minutum*

10′. Sterile laminae 1.8 to 2.5(to 4) times longer than wide, ovate-lanceolate or spatulate, usually widest below the middle; at elevations from (800)1700 to 3800 m .......... *E. squamipes*

8′. Sterile laminae 0.8–3.5 cm long, 0.8 to 2.5 times longer than wide, lunate, deltate, ovate, elongate deltate, elliptic, or rhombic .......... 11

11. Sterile laminae lunate or flabellate .......... *E. peltatum* f. *standleyi*

11′. Sterile laminae deltate or elongate deltate, ovate, rhombic, elliptic, or lanceolate .......... 12

12. Sterile laminae rhombic .......... 13

13. Sterile laminae 0.4–0.7 cm wide; at elevations from 1800 to 2100 m .......... *E. bryogenes*

13′. Sterile laminae 0.9–1.9 cm wide; at elevations from 2400 to 3200 m .......... *E. rhomboideum*

12′. Sterile laminae elliptic, deltate, or elongate deltate .......... 14

14. Scales on the abaxial surface of the sterile laminae black throughout, or black only at point of attachment, or at the apex .......... 15

15. Sterile laminae minutely crenulate, typically elongate-deltate .......... *E. andreanum*

15′. Sterile laminae entire, elliptic to deltate .......... 16

16. Scales on the abaxial surface of the sterile laminae 1–2 mm long; sterile laminae elliptic, short-decurrent .......... *E. concinnum*

16′. Scales on the abaxial surface of the sterile laminae 2.5–3 mm long; sterile laminae deltate, truncate .......... *E. anthracinum*

14′. Scales on the abaxial surface of the sterile laminae orange or light to dark brown .......... 17

17. Sterile laminae entire .......... 18

18. Scales on the adaxial surface of the sterile laminae linear, the bases hastate by linear processes, scales on the abaxial surface of the sterile laminae 0.3–1.2 mm ................................................ *E. blepharis*
18′. Scales on the adaxial surface of the sterile laminae narrowly lanceolate, scales on the abaxial surface of the sterile laminae 1–2 mm ..... *E. concinnum*
17′. Sterile laminae minutely crenulate ........................................... 19
19. Sterile laminae deltate or deltate-hastate ...................... *E. deltoideum*
19′. Sterile laminae elongate-deltate ............................... *E. andreanum*

1. **Elaphoglossum andreanum** Christ, Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 36: 100, fig. 80. 1899. TYPE: Colombia. Nariño: cordillera Oriental, Alto del Tábano in Andibus Pastoensibus, [1°48″S, 78°35″W], 3200 m, 4 Mar. 1876, *E. André 3114* (holotype, P not seen, P photos GH!, NY!; isotypes, B!, GH!, NY!). Figures 1B, 4F–L.

Rhizomes 1 mm wide, long-creeping; rhizome scales 3–5 mm, appressed, lanceolate, entire, light orange to brown, concolorous or with dark point of attachment, dull. Sterile leaves 2.6–9.5 cm; petioles 0.9 to 2.2 times the lamina length; petiolar scales 1.5–3 mm, scattered, lanceolate, light orange to brown, concolorous or black at point of attachment; laminae 1–3.5 × 0.6–2 cm, 1.1 to 2.1 times longer than wide, coriaceous, simple, slightly elongate, deltate or rarely narrowly rhombic, margins minutely crenulate, rarely (in small specimens) entire, apices rounded, bases truncate; adaxial lamina surface scaly, the scales 0.5–1.5 mm, ovate to lanceolate, often hastate at base and sometimes with lateral processes as long as the length of the scale, usually light orange to dark brown or black; abaxial lamina surface scaly, the scales (0.2–) 0.7–1.5 mm, ovate to lanceolate, often hastate at the base, sometimes with lateral processes as long as the length of the scale, sometimes the scales reduced to ca. 0.2 mm and circular or stellate, light orange (sometimes black at point of attachment) to dark brown or black. Fertile leaves 2.7–7.5 cm; petioles 2 to 3 times the lamina length; laminae 0.9–2.3 × 0.7–1.9 cm, ovate to slightly oblong, entire, apices broadly acute to rounded, bases slightly cordate to truncate or broadly cuneate; intersporangial scales 0.5–2 mm, light brown to dark brown or black.

*Distribution and elevation. Elaphoglossum andreanum* occurs in Colombia and Ecuador; specimens have been collected at elevations from 2800 to 3700 m.

*Discussion. Elaphoglossum andreanum* is characterized by small leaves not exceeding 9.5 cm and slightly elongate-deltate laminae with minutely crenulate margins. It occurs at higher elevations than most other species of *Elaphoglossum* sect. *Squamipedia*, which are generally found between 1500 and 3000 m. The species resembles *E. concinnum* Mickel, which differs by more elliptic or rhombic laminae, broadly obtuse lamina apices, and occurrence at slightly lower elevations (2450–3000 m, southern Ecuador and Peru). Also similar is *E. squamipes*, which differs by laminae 1.8 to 2.5(to 4) times longer than wide, lanceolate or elliptic and entire (rarely minutely crenulate, and only in small laminae). See *E. anthracinum* A. Vasco, Mickel & R. C. Moran, *E. blepharis* A. Vasco, Mickel & R. C. Moran, *E. bryogenes* Mickel, *E. rhomboideum* A. Vasco, Mickel & R. C. Moran, and *E. squamipes* for morphological comparisons to those species.

*Additional specimens examined.* COLOMBIA. **Antioquia:** Mpio. Bolivar, *Rodríguez et al. 4692* (HUA, NY). **Cauca:** macizo Colombiano, páramo de las Papas, alrededor de la laguna de Cusiyaco, *Barclay 5969* (COL, GH, MO); Par. Nac. Nat. Puracé, sitio Peña Amarilla, al S de la laguna San Rafael, *Duque 162* (COL). **Cundinamarca:** Mpio. de Fomeque, páramo de Chingaza, *Huertas & Camargo 5928* (COL). **Huila:** Depto. Huila-Cauca, macizo Colombiano, páramo de Las Papas, cerros y alrededores de la laguna La Magdalena, *Idrobo et al. 2992* (COL, NY). **Meta:** cerro Nevado del Sumapaz, quebrada El Buque, *Cleef 7839* (COL). **Nariño:** páramo del Tábano, alto de la cordillera entre Pasto y El Encanto, vertiente W, *Cuatrecasas 11911* (COL, F); páramo El Tábano al E de Pasto, *Hagemann & Leist 1359* (COL); Mpio. de Pasto, Correg. El Encano, El Motilón–El Socorro, *Ramírez 2822* (COL). **Putumayo:** Mpio. de Santiago, vereda de San Antonio de Bellavista, páramo de Bordoncillo, *Ramírez et al. 4721* (COL); valle de Sibundoy, *Schultes & Cabrera 20100* (COL, NY). **Quindío:** Mpio. de Salento, Est. Biol. Estrella de Agua, camino hacia el Alto del Colmillo, *Vélez et al. 4206* (COL). **Risaralda:** Mpio. de Sta. Rosa, entre la Hacienda La Sierra y Termales de Sta. Rosa, quebrada La Sierra, *Jaramillo-M. et al. 5919* (COL), *5973* (COL). **Santander:** W slope of páramo Rico, *Killip & Smith 17867* (GH, NY). **Unknown:** *Lehmann 4928* (K).

ECUADOR. **Carchi:** Above La Esperanza, 5 km W of El Carmelo on rd. to Tulcán, *Løjtnant et al. 12069* (AAU); Est. Biol. La Guandera, *Moran et al. 6867* (NY, QCA, QCNE); ca. 1/2 hr. E of Huaca, past Colonia Huaceña, *van der Werff & Palacios 10621* (AAU, MO, NY, UC). **Imbabura:** boggy areas E of Cayambe Peak, *Wiggins 10423* (NY). **Loja:** Cerro Toledo, E of Yangana, betw. Loja & Valladolid, *Lehnert 1460* (NY, UC); Par. Nac. Podocarpus E of Nudo de Cajanuma, trail from "centro de informacion" toward Lagunas de Compadre, *Øllgaard 90336* (AAU, QCA, QCNE). **Morona-Santiago:** rd. Gualaceo–Plan de Milagro, 3.8 km E of pass, *Øllgaard & Navarrete 2797* (AAU); Muletrack Sevilla de Oro–Mendez, E slope at Cerro Negro, El Castillo, *Øllgaard &*

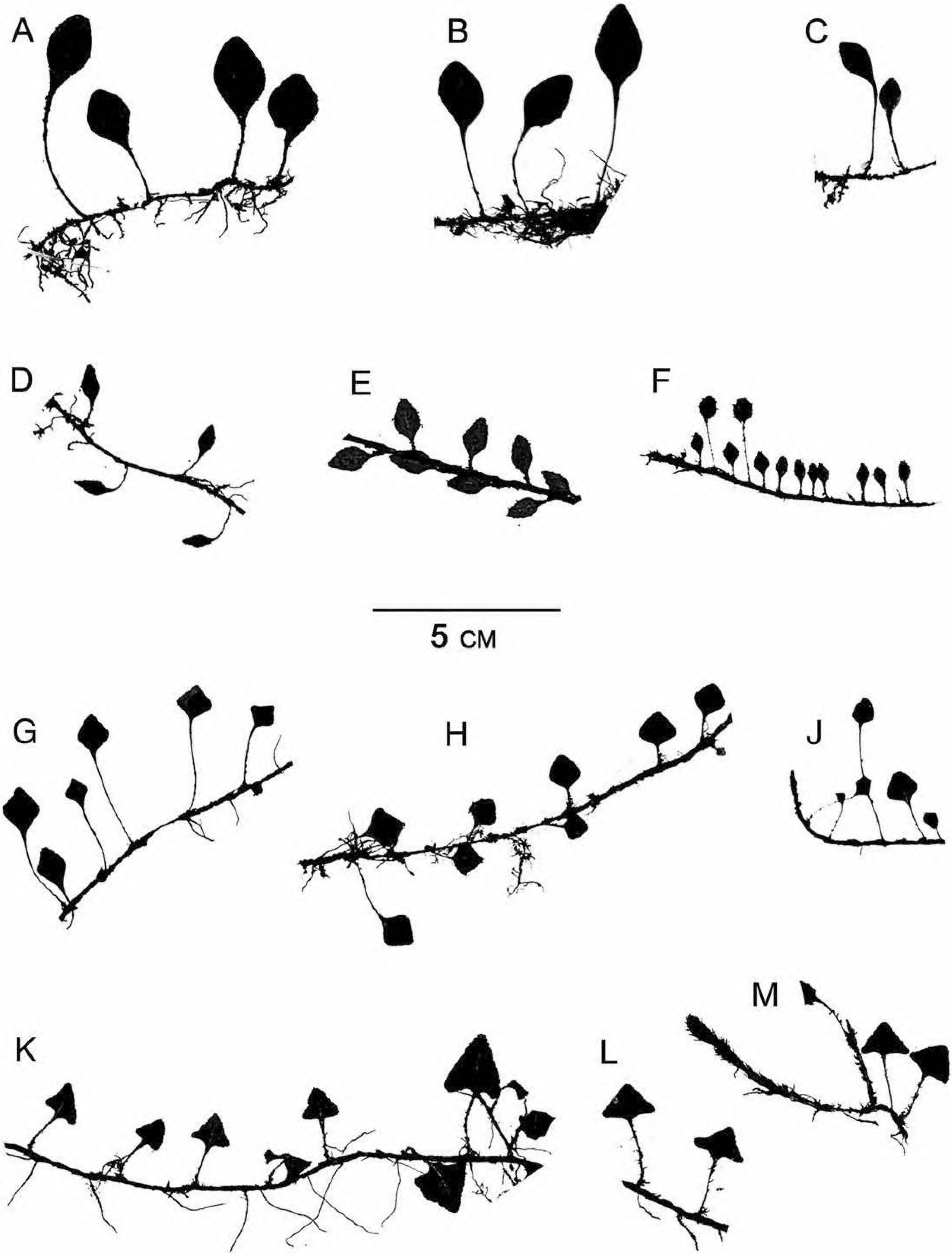

Figure 5. Silhouettes of four species of *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa. A–C. *Elaphoglossum concinnum* Mickel. D–F. *Elaphoglossum bryogenes* Mickel. G–J. *Elaphoglossum rhomboideum* A. Vasco, Mickel & R. C. Moran. K–M. *Elaphoglossum deltoideum* (Sodiro) Christ. A from *Øllgaard & Fiel 91139* (AAU); B from *van der Werff & Palacios 9054* (NY); C from *Cottón et al. A1546* (NY); D from *Øllgaard et al. 35936* (AAU); E from *Luteyn & Sylva 14682* (MO); F from *Luteyn & Sylva 14682* (NY); G from *Holm-Neilsen et al. 6168* (UC); H from *Holm-Neilsen et al. 6168* (AAU); J from *Alston 8235* (MO); K from *Camp E-3419* (NY); L from *Sodiro s.n.* (K); M from *Sodiro s.n.* (P).

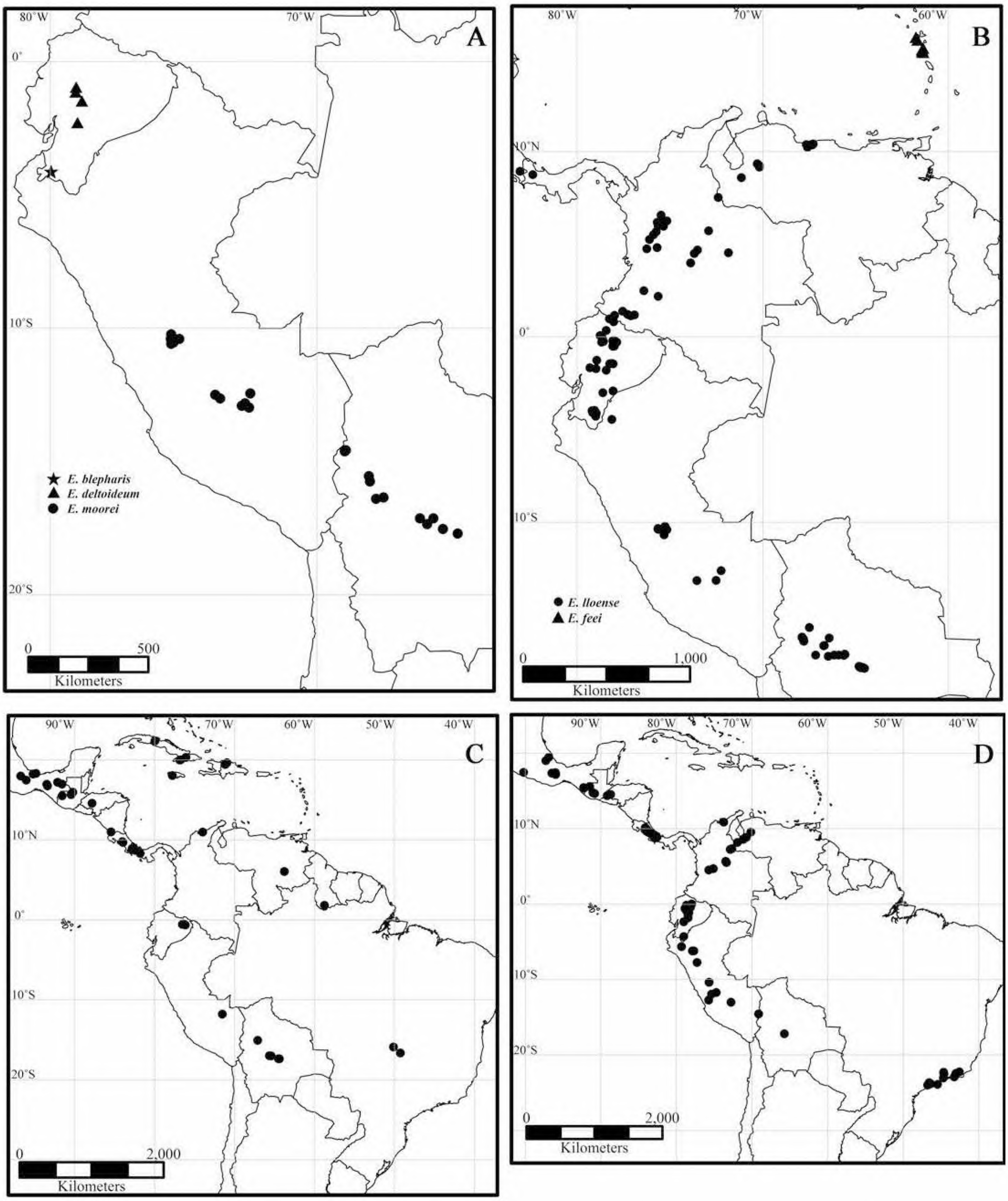

Figure 6. Distribution maps. —A. *Elaphoglossum blepharis* A. Vasco, Mickel & R. C. Moran (★), *E. deltoideum* (Sodiro) Christ (▲), and *E. moorei* (E. Britton) Christ (●). —B. *Elaphoglossum feei* (Bory ex Fée) T. Moore (▲) and *E. lloense* (Hook.) T. Moore (●). —C. *Elaphoglossum minutum* (Pohl ex Fée) T. Moore. —D. *Elaphoglossum squamipes* (Hook.) T. Moore.

*Balslev 9530* (AAU, NY, QCA, UC). **Napo:** carr. Baeza–Quito, 5 km después de Cuyuja, hac. Flor del Bosque, *Navarrete 397* (AAU, NY, QCA, QCNE); Llanganati, N-facing slope toward Río Golpe, N of Chosa Aucacocha, *Øllgaard et al. 38623* (AAU, GH, UC). **Pichincha:** rd. Olmedo–laguna San Marcos, W of pass, *Øllgaard et al. 34364* (AAU). **Sucumbios:** cerro El Mirador, 4 km SW de la poblacion de Cocha Seca, subiendo por el sector de Chozas Viejas, *Gavilanes & Funk 848* (AAU, QCA).

**2. Elaphoglossum anthracinum** A. Vasco, Mickel & R. C. Moran, sp. nov. TYPE: Ecuador. Napo: 8–12 km ESE of Santa Barbara, 0°40′S, 77°30′W, 2780–2880 m, 11 Jan. 1985, *J. L. Luteyn & E. Cotton 11002* (holotype, QCA!; isotypes, MO!, NY! [3], QCNE!, UC!). Figures 1C, 3N–R, 4A–C.

Rhizomes 1 mm wide, long-creeping; rhizome scales 4–5 mm, appressed, lanceolate, entire, orange to brown, concolorous to darkened at point of attachment, lustrous. Sterile leaves 3–7 cm; petioles 0.8 to 2 times the lamina length; petiolar scales 1–2 mm, scattered, lanceolate, light orange to brown with black point of attachment, those scales toward petiole bases sometimes black proximally; laminae 1–2.5 × 1.2–2.2 cm, ca. as long as wide, coriaceous, simple, deltate, margins entire, apices rounded, bases truncate; adaxial lamina surface scaly, the scales 1.5–3 mm, scattered, straight to curved, linear to narrowly lanceolate, black, slightly hastate at the base; abaxial lamina surface scaly, the scales 2.5–3 mm, hastate, black, shiny. Fertile leaf (1 seen) 4.5 cm; petiole 3 times longer than laminae; lamina 1.2 × 1 cm, ovate, entire, apex broadly acute, base slightly cordate; intersporangial scales 2.5–3.2 mm, abundant, black, lustrous.

*Etymology.* *Elaphoglossum anthracinum* is distinguished by its many black lustrous laminar scales. This character gives rise to the specific epithet, which means "coal black" in Latin.

*Distribution and elevation.* *Elaphoglossum anthracinum* occurs in Colombia and Ecuador; specimens have been collected at elevations from 2780 to 3050 m.

*IUCN Red List category.* According to IUCN Red List criteria, at this point this species must be classified as DD (Data Deficient). Because *Elaphoglossum anthracinum* is a new species, more information is needed to determine its appropriate IUCN listing.

*Discussion.* *Elaphoglossum anthracinum* is distinguished by its deltate laminae, petiolar scales that are black around the point of attachment, and many black lustrous laminar scales. *Elaphoglossum anthracinum* resembles *E. andreanum* in the size of the leaves and the dark brown to black laminar scales. However, the new species differs by larger (2.5–3 mm vs. [0.2–]0.7–1.5 long in *E. andreanum*) scales on the abaxial surface of the laminae. The specimen with a single fertile leaf (*Lozano 3489*) has dense, black, shiny intersporangial scales 2.5–3 mm long; in contast, *E. andreanum* has intersporangial scales less dense, only 0.5–2 mm long, and ranging in color from light orange to dark brown or black.

*Paratype.* COLOMBIA. **Cauca:** Mpio. de Coconuco, valle de Paletará, Par. Nac. Nat. de Puracé, [2°12′15″N, 76°29′47″W], 3050 m, 29 July 1980, *G. Lozano 3489* (COL).

**3. Elaphoglossum blepharis** A. Vasco, Mickel & R. C. Moran, sp. nov. TYPE: Ecuador. Loja: Celica–Zapotillo rd., Km. 6–10, potreros and remnants of seasonal evergreen forest, [4°07′S, 79°59′W], 1800–1900 m, 10 Apr. 1980, *G. W. Harling & L. Andersson 18092* (holotype, AAU!). Figures 2A–D, 4D, E, 6A.

Rhizomes 1–2 mm wide, long-creeping; rhizome scales 3–4 mm, appressed, lanceolate, entire or with rare projections at base, orange-tan, dull. Sterile leaves 3–4.5 cm; petioles 0.8–1.5 times the lamina length; petiolar scales 1.5–3 mm, scattered to imbricate, narrowly lanceolate to ovate-lanceolate, mostly entire, light orange to brown, the base hastate or with projections; laminae 1–2 × 1.5–2 cm, ca. as long as wide, coriaceous, simple, deltate, margins entire, apices obtuse, bases truncate; adaxial lamina surface scaly, the scales 1–2 mm, linear, light orange to brown, concolorous, dull, the bases hastate by linear processes; abaxial surface scaly, the scales 0.3–1.2 mm, linear, with short inconspicous basal projections, orange, dull. Fertile leaves 7–10 cm; petioles 4 to 5.5 times the lamina length; laminae 1.2–2 × 0.7–1 cm, narrowly deltate, entire, apices obtuse, bases truncate to subcordate; intersporangial scales ca. 1 mm, scattered, narrowly lanceolate, hastate, light orange to brown, dull.

*Etymology.* *Elaphoglossum blepharis* has adaxial laminar scales that are hastate at the base by hairlike processes. This character gives rise to the specific epithet, which is a noun in apposition, meaning "eyelash" in Greek.

*Distribution and elevation.* As currently known, *Elaphoglossum blepharis* is restricted to Loja, Ecuador, collected at elevations from 1800 to 2200 m.

*IUCN Red List category.* According to IUCN Red List criteria, this species is classified as DD (Data Deficient). Because *Elaphoglossum blepharis* is a new species, more information is needed to determine its appropriate IUCN listing.

*Discussion.* *Elaphoglossum blepharis* differs from *E. andreanum* by its extremely narrow scales on the laminae adaxially. These scales are hastate with hairlike processes basally. Similar narrow scales are found on the laminae adaxially in *E. tripartitum*, which resolved as sister to *E. blepharis* in our chloroplast DNA sequence analyses (Vasco et al., in prep.). Furthermore, *E. blepharis* has laminae with entire margins, whereas those in *E. andreanum* are minutely crenulate.

*Paratype.* ECUADOR. **Loja:** Celica–Zapotillo Rd., ca. Km. 5, [4°07′S, 79°57′W], 2100–2200 m, 23 Feb. 1983, *G. W. Harling & L. Andersson 22455* (QCA).

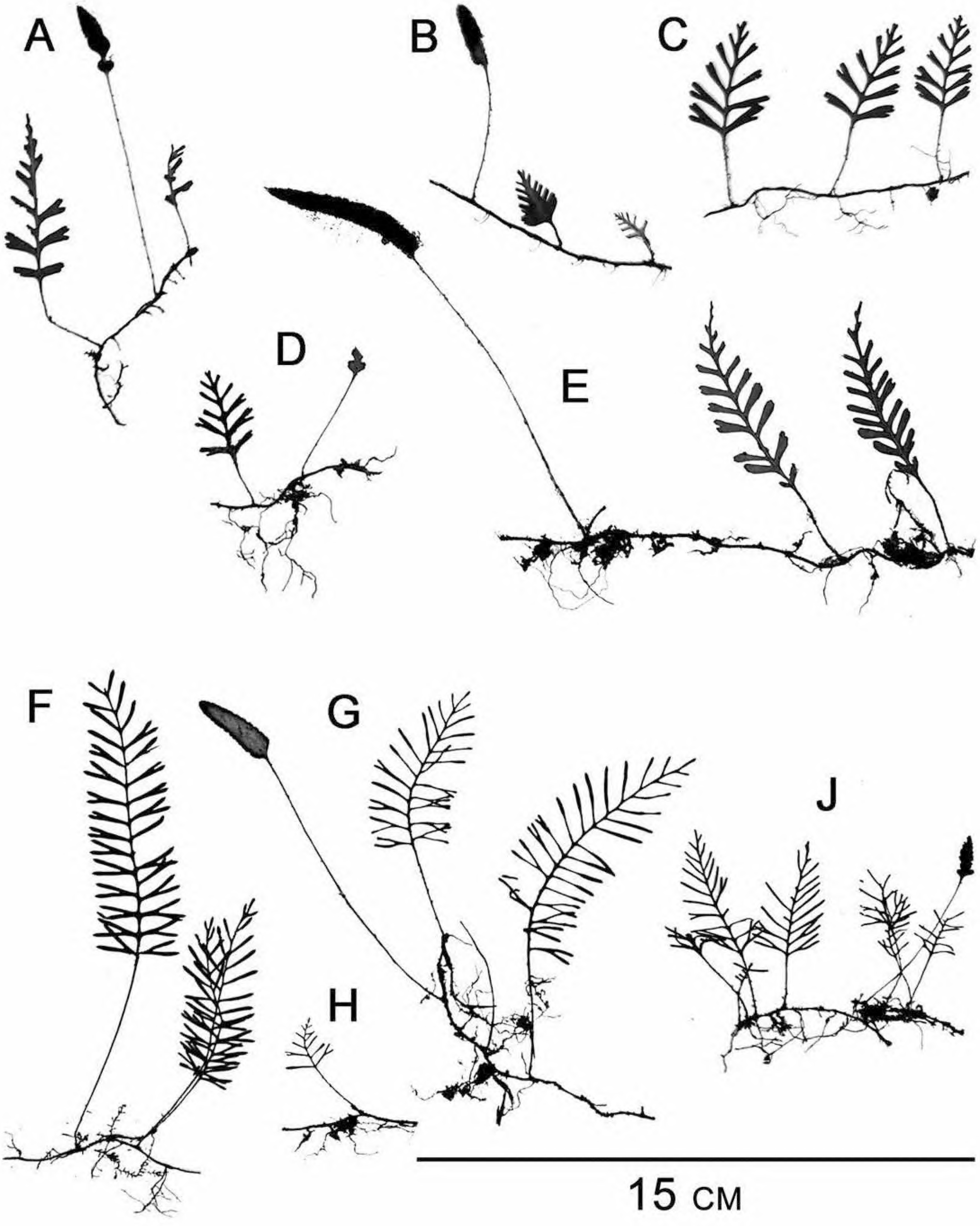

Figure 7. Silhouettes of the two species of *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa with pinnately divided laminae. A–E. *Elaphoglossum colombianum* (Maxon) Mickel. F–J. *Elaphoglossum moorei* (E. Britton) Christ. A from *van der Werff & Giraldo 9726* (NY); B from *Luteyn et al. 12248* (NY); C from *Ramos et al. 1139* (NY); D from *Vasco et al. 636* (NY); E from *van der Werff & Giraldo 9726* (NY); F from *Cayola et al. 2847* (MO); G, H from *Fernández & Altamirano 3110* (MO); J from *Kessler et al. 6961* (NY).

4. **Elaphoglossum bryogenes** Mickel, Brittonia 45: 213. 1993. TYPE: Ecuador. Napo: cordillera de Huacamayos, 4.3–16.5 km S of Cosanga on Baeza–Puyo rd., 0°37′S, 77°51′W, 1830–2130 m, 15 Oct. 1992, *J. L. Luteyn & D. S. Sylva 14682* (holotype, NY!; isotypes, AAU!, MO!, UC!, US!). Figures 1C, 2J–M, 5D–F.

Rhizomes 1 mm wide, long-creeping; rhizome scales 3–5 mm, appressed, lanceolate, entire, light orange to brown, concolorous or dark at point of attachment, dull. Sterile leaves 2.1–3 cm; petioles 0.25 to 1.7 times the lamina length; petiolar scales 1–1.5 mm, scattered, lanceolate, entire, brown, concolorous, dull; laminae 1–1.8 × 0.4–0.7 cm, 0.8 to 1 times longer than wide, coriaceous, simple, narrowly rhombic, margins entire, apices rounded to broadly acute, bases short-cuneate; adaxial lamina surface scaly, the scales 1–2 mm, ovate to lanceolate, often hastate at the base, brown, slightly shiny; abaxial lamina surface scaly, the scales 1–1.5 mm, ovate to lanceolate, often hastate at the base, brown, slightly shiny. Fertile leaf (only 1 leaf seen) 3 cm; petiole 2 to 3 times longer than the lamina; lamina 1 × 0.6 cm, ovate to broadly elliptic, entire, apices broadly acute to rounded, bases broadly cuneate; intersporangial scales 1.5–2 mm, dark brown.

*Distribution and elevation.* *Elaphoglossum bryogenes* is known only from Ecuador, from the east side of the Andes, at elevations from 1800 to 2130 m.

*Discussion.* *Elaphoglossum bryogenes* greatly resembles *E. andreanum* in its laminar scales that are brown, ovate to lanceolate, and often hastate at the base. It differs by the entire and narrowly rhombic laminae, versus minutely crenulate and slightly elongated laminae in *E. andreanum*. Also, *E. bryogenes* generally has smaller leaves (2.3–3 cm vs. 2.6–9.5 cm long in *E. andreanum*).

*Additional specimen examined.* ECUADOR. **Napo:** rd. Baeza–Tena, ca. 23 km from Baeza, *Øllgaard et al. 35936* (AAU).

5. **Elaphoglossum colombianum** (Maxon) Mickel, Brittonia 32: 116. 1980, as "*columbianum.*" Basionym: *Microstaphyla colombiana* Maxon, J. Wash. Acad. Sci. 13: 30. 1923. *Peltapteris colombiana* (Maxon) L. D. Gómez, Brenesia 6: 30. 1975. TYPE: Colombia. El Valle: La Cumbre, summit of W peak, [3°40′N, 76°35′W], 2100–2400 m, 11 & 18 Sep. 1922, *E. P. Killip 11365* (holotype, US!; isotypes, GH!, NY! [2]). Figures 1C, 7A–E, 8M, N.

Rhizomes 0.6–0.9 mm wide, long-creeping; rhizome scales 1–2.5 mm, appressed, lanceolate, subentire with occasional projections, light orange to brown, dull. Sterile leaves 3–17 cm; petioles 0.8 to 2.3 times the lamina length; petiolar scales 0.8–1.5 mm, scattered, clasping to spreading, ovate, with small marginal projections, light orange to brown; laminae 2.5–5.5 × 1.7–2.6 cm, 1 to 3.2 times longer than wide, chartaceous, pinnately divided, lanceolate to oblong or subtriangular, margins entire, apical segments similar to lateral ones, base truncate, cuneate or slightly reduced, pinnae 1–2 mm wide, 5 to 9 pairs, ascending, sometimes notched or divided at the apex; adaxial lamina surface glabrous to sparsely scaly, the scales 0.1–0.5 mm, brown, sometimes darker at point of attachment, dull; abaxial lamina surface sparsely scaly, the scales 0.1–1 mm, with small marginal projections, brown, sometimes darker at point of attachment. Fertile leaves 4–14 cm long; petioles 2.1 to 5.5 times the lamina length; laminae 0.9–4.5 × 0.3–1 cm, oblong, entire to shallowly lobed, rarely with 1 free pair of proximal pinnae, apices rounded, bases truncate; intersporangial scales absent.

*Distribution and elevation.* *Elaphoglossum colombianum* is known only from western Colombia at elevations from 1600 to 2400 m.

*Discussion.* *Elaphoglossum colombianum* resembles *E. moorei* in its pinnately divided laminae, but differs by fewer and wider pinna pairs. There are five to nine pinna pairs that extend to 2 mm wide at their bases in *E. colombianum*, which contrasts with eight to 17 pinna pairs that are 0.4–1 mm wide at their bases in *E. moorei* (also see Fig. 7). Pinnae in *E. colombianum* tend to be more ascending compared to those of *E. moorei*. The two species are distinct geographically: *E. colombianum* is restricted to western Colombia (Fig. 1C), whereas *E. moorei* is restricted to Peru and Bolivia (Fig. 6A).

*Additional specimens examined.* COLOMBIA. **Antioquia:** Mpio. Yarumal/Valdivia, vereda El Cedro, sitio Alto de Ventanas, *Gómez et al. 685* (HUA). **Chocó:** Mpio. San José del Palmar, cerro del Torrá, vertiente W del río Negro abajo del Helipuerto, vereda del río Negro, *Ramos-Pérez et al. 1063* (NY), *Ramos-Pérez et al. 1103* (NY), *Ramos-Pérez et al. 1139* (NY). **Risaralda:** Mpio. Pueblo Rico, vereda Montebello, cerca a Los Cajones, subiendo hacia la base militar, *Vasco et al. 622* (HUA, NY), *Vasco et al. 636* (HUA, NY). **Valle del Cauca:** Mpio. El Cairo, Serranía de Los Paraguas, Valle-Chocó border, *Luteyn et al. 12248* (NY); Mpio. Cali, finca Zingara, at Km. 18 rd. Cali–Buenaventura, *van der Werff & Giraldo 9726* (MO, NY, PMA, UC).

6. **Elaphoglossum concinnum** Mickel, Fieldiana, Bot., n.s. 27: 128. 1991. TYPE: Peru. San Martín: Prov. Mariscal Cáceres, Río Abiseo Nat. Park, near Las Papayas ruins, 7°56′S, 77°21′W, 2600–2850 m, 26 July 1985, *K. R. Young 1301* (holotype, NY!). Figures 1C, 2R–U, 3G–L, 5A–C.

Rhizomes 0.5–1 mm wide, long-creeping; rhizome scales 4–7 mm, appressed, narrowly lanceolate, entire, orange-tan, dull. Sterile leaves 0.9–2.6(–3.5) cm; petioles 1.2 to 3 times the lamina length; petiolar scales 1–2.5 mm, scattered, spreading, lanceolate to

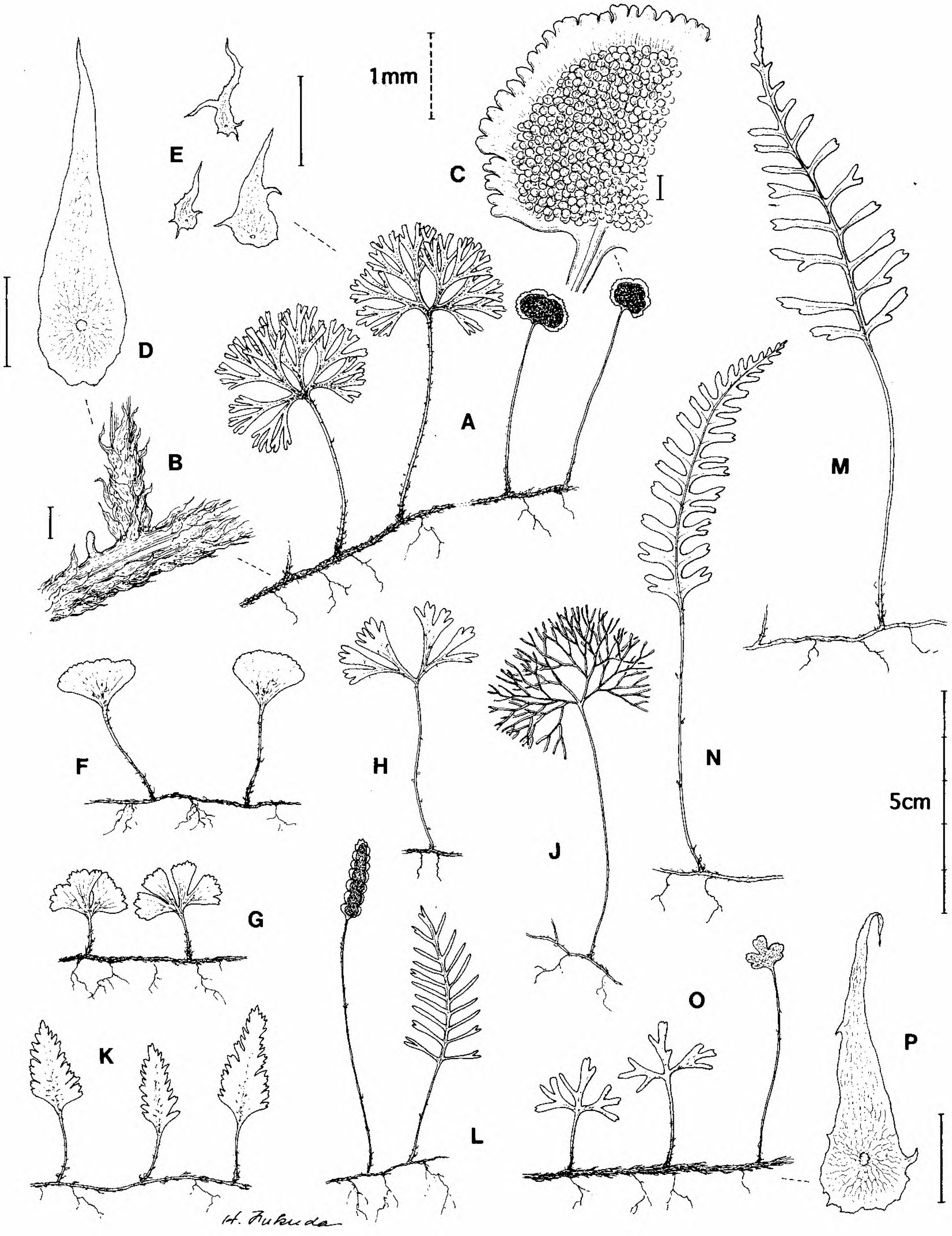

Figure 8. A–E. *Elaphoglossum peltatum* (Sw.) Urb. f. *peltatum.* —A. Habit, with two fertile leaves at right. —B. Rhizome detail, note peglike aerophore at left of petiole base. —C. Fertile lamina detail. —D. Rhizome scale. —E. Laminar scales. —F. *Elaphoglossum peltatum* f. *standleyi* (Maxon) Mickel, habit, sterile leaves only. G, H. *Elaphoglossum peltatum* f. *flabellatum* (Humb. & Bonpl. ex Willd.) Mickel. —G. Habit, sterile leaves only, dichotomously divided. —H. Habit, sterile leaf only, showing greater division of dichotomous lobing of lamina. —J. *Elaphoglossum peltatum* (Sw.) Urb. f. *peltatum*, habit. —K. *Elaphoglossum moorei* (E. Britton) Christ × unknown hybrid parent, sterile leaves, showing the lack of pinnate division to laminae. —L. *Elaphoglossum moorei* (E. Britton) Christ, habit, fertile leaf at left, sterile leaf at right with typical pinnate division. M, N. *Elaphoglossum colombianum* (Maxon) Mickel, sterile leaves. O, P. *Elaphoglossum tripartitum* (Hook. & Grev.)

hastate, entire, orange to brown; laminae 0.4–1.2 × 0.5–0.9 cm, 1.3 to 2.5 times longer than wide, subcoriaceous, simple, ovate and suborbicular to rhombic, margins entire, apices obtuse, bases shortly decurrent along petiole; adaxial lamina surface glabrous to sparsely scaly, the scales 1–2 mm, narrowly lanceolate, dark brown to black but lighter than those on the abaxial surface, slightly shiny; abaxial lamina surface sparsely scaly, the scales 1–2 mm, linear to deltate, subentire, with sparse irregular teeth, dark brown to black, sometimes with brown borders. Fertile leaves 4–7 cm; petioles 4 to 5 times the lamina length; laminae 0.7–1.5 × 0.5–1.6 cm, ovate to suborbicular, entire, apices obtuse, bases truncate to slightly cordate; intersporangial scales 1–2 mm, scattered, hastate, dark reddish brown to black, shiny.

*Distribution and elevation.* *Elaphoglossum concinnum* is found in southern Ecuador and northern Peru, at elevations from 2450 to 3000 m.

*Discussion.* *Elaphoglossum concinnum* is characterized by suborbicular to ovate or rhombic laminae with obtuse apices. *Elaphoglossum andreanum* is similar, but differs by the typically slightly elongate deltate laminae with minutely crenulate margins. See *E. rhomboideum* for a comparision with that species.

*Additional specimens examined.* ECUADOR. **Loja:** Rd. Loja–Saraguro, Km. 28, *Cotton et al. A1546* (MO, NY, QCA, QCNE); am Ramos-Urca und Cerro Acacana, *Lehmann 7658* (K); new rd. Loja–Saraguro, Km. 17, *Øllgaard & Feil 91139* (AAU, QCA, QCNE); about 10 km SW of Loja, along rd. past the university towards La Violeta, *van der Werff & Palacios 9054* (MO, NY, QCNE, UC). **Zamora-Chinchipe:** new rd. Loja–Zamora, ca. 4 km E of pass "El Tiro," *Lehnert 1409* (NY, UC).

PERU. **Amazonas:** ridge above the small settlement "quebrada Oso Perdido," on carretera marginal betw. Pedro Ruiz & Moyobamba, *Pimelkese 1367* (MO).

7. **Elaphoglossum deltoideum** (Sodiro) Christ, Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 36: 56, fig. 19. 1899. Basionym: *Acrostichum deltoideum* Sodiro, Crypt. Vasc. Quit. 466. 1893. TYPE: Ecuador. Chimborazo: "la pendiente occidental del Chimborazo, cerca de Tamboloma," [1°28′S, 78°49′W], s.d., *A. Sodiro s.n.* (holotype, P!, P photo MO; isotype, K!). Figures 3M, 5K–M, 6A.

Rhizomes 1–2 mm wide, long-creeping; rhizome scales 5–6 mm, appressed, lanceolate, entire or with occasional projections, light orange to brown, dull. Sterile leaves 3.4–6 cm; petioles 0.8 to 2.5(to 4) times the lamina length; petiolar scales 1–2 mm, scattered, lanceolate, hastate, entire, brown, concolorous or dark at point of attachment; laminae 1–2.5 × 1.5–2 cm, ca. as long as wide, chartaceous, simple, deltate or sometimes slightly hastate, margins usually crenulate, apices acute, bases truncate; adaxial lamina surface sparsely scaly, the scales 0.4–1.5 mm, linear-hastate (the body only 2 or 3 cells wide), brown to light brown; abaxial lamina surface sparsely scaly, the scales 0.5–1.5 mm, laceolate to hastate, light brown to brown. Fertile leaves 5–6 cm, petioles 2 to 4 times the lamina length; laminae 1.2–2 × 0.7–0.9 cm, ovate to deltate, apices obtuse, bases truncate to cuneate; intersporangial scales 1.5–2 mm, filiform-hastate, brown.

*Distribution and elevation.* *Elaphoglossum deltoideum* is known only from Volcan Cotopaxi and Chimborazo in Ecuador, at elevations from 1600 to 2400 m.

*Discussion.* *Elaphoglossum deltoideum* is distinguished by broadly deltate laminae that are sometimes hastate. One collection (*Croat 73680*) is atypical in its thinner laminae and some more elongate leaves as in *E. andreanum*; otherwise, the collection seems typical for *E. deltoideum*.

*Elaphoglossum deltoideum* sometimes exhibits laminae that are slightly hastate or 3-lobed (Fig. 3M), and in these lobes it approaches *E. tripartitum*, which has much more finely divided leaves. Nevertheless, a few specimens of *E. tripartitum* (e.g., *Holm-Nielsen 18151*, *Laegaard 54626*) have typical leaves mixed with some that are less divided. These less-divided laminae are indistinguishable from the hastate or 3-lobed individual laminae of *E. deltoideum*. This observation suggests that the two species are related; in fact, a sister relationship between the two species is supported by molecular phylogenetic studies of chloroplast DNA sequences (Vasco et al., in prep.).

←

Mickel. —O. Habit, with three leaves, fertile one at right. —P. Rhizome scale. A–E from *Méndez 7931* (NY); F from *Asplund 19710* (NY); G from *Luteyn 10765* (NY); H from *Øllgaard 98068* (AAU); J from *Holm-Nielsen et al. 2944* (MO); K from *Kessler 7078* (NY); L from holotype *Bang 558* (NY); M, N from isotype *Killip 11365* (NY); O from *Jameson 44* (NY). All habit illustrations conform to the 5-cm scale bar; all other scale bars equal 1 mm.

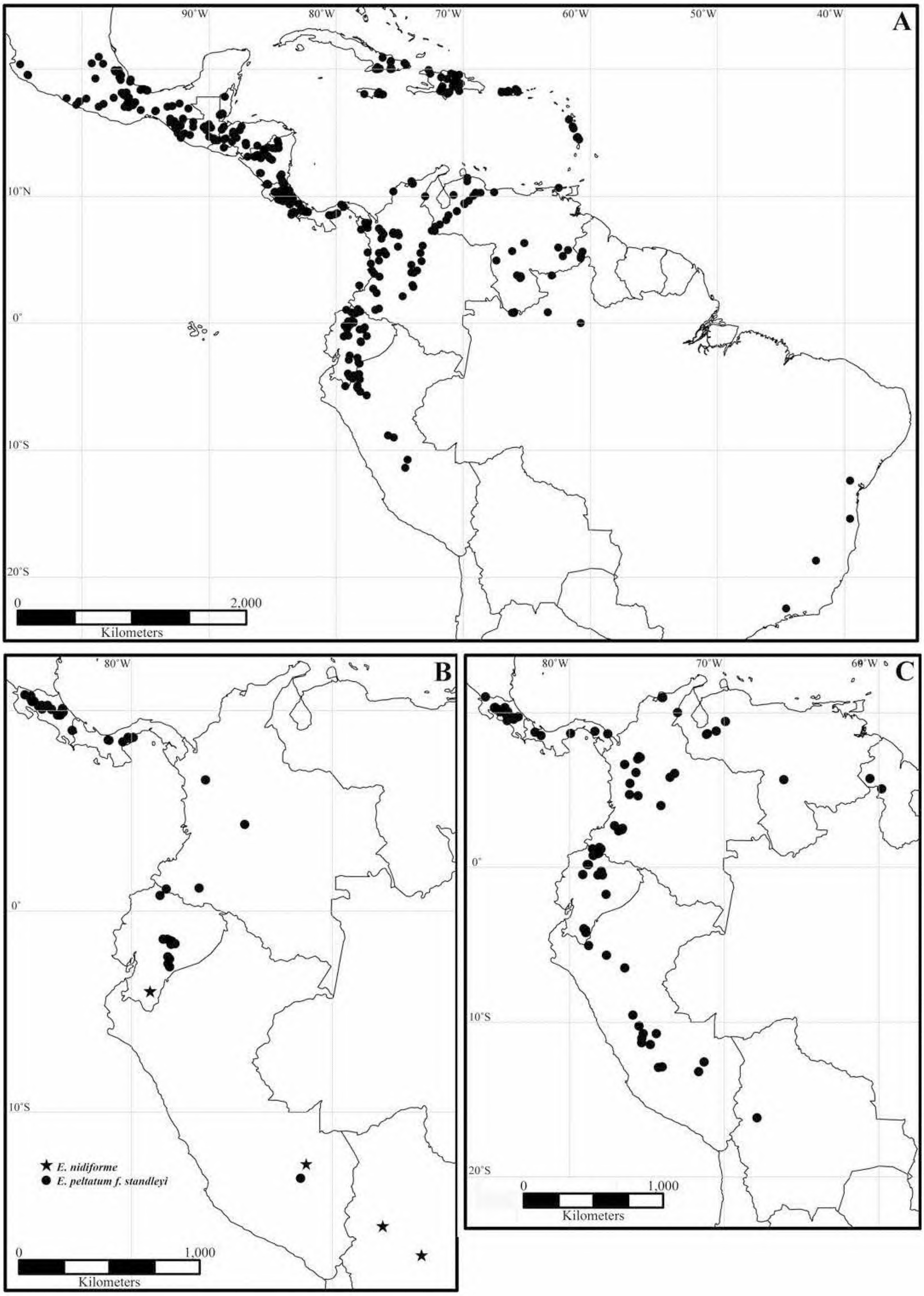

Figure 9. Distribution maps. —A. *Elaphoglossum peltatum* (Sw.) Urb. f. *peltatum*. —B. *Elaphoglossum nidiforme* Mickel (★) and *E. peltatum* f. *standleyi* (Maxon) Mickel (●). —C. *Elaphoglossum peltatum* f. *flabellatum* (Humb. & Bonpl. ex Willd.) Mickel.

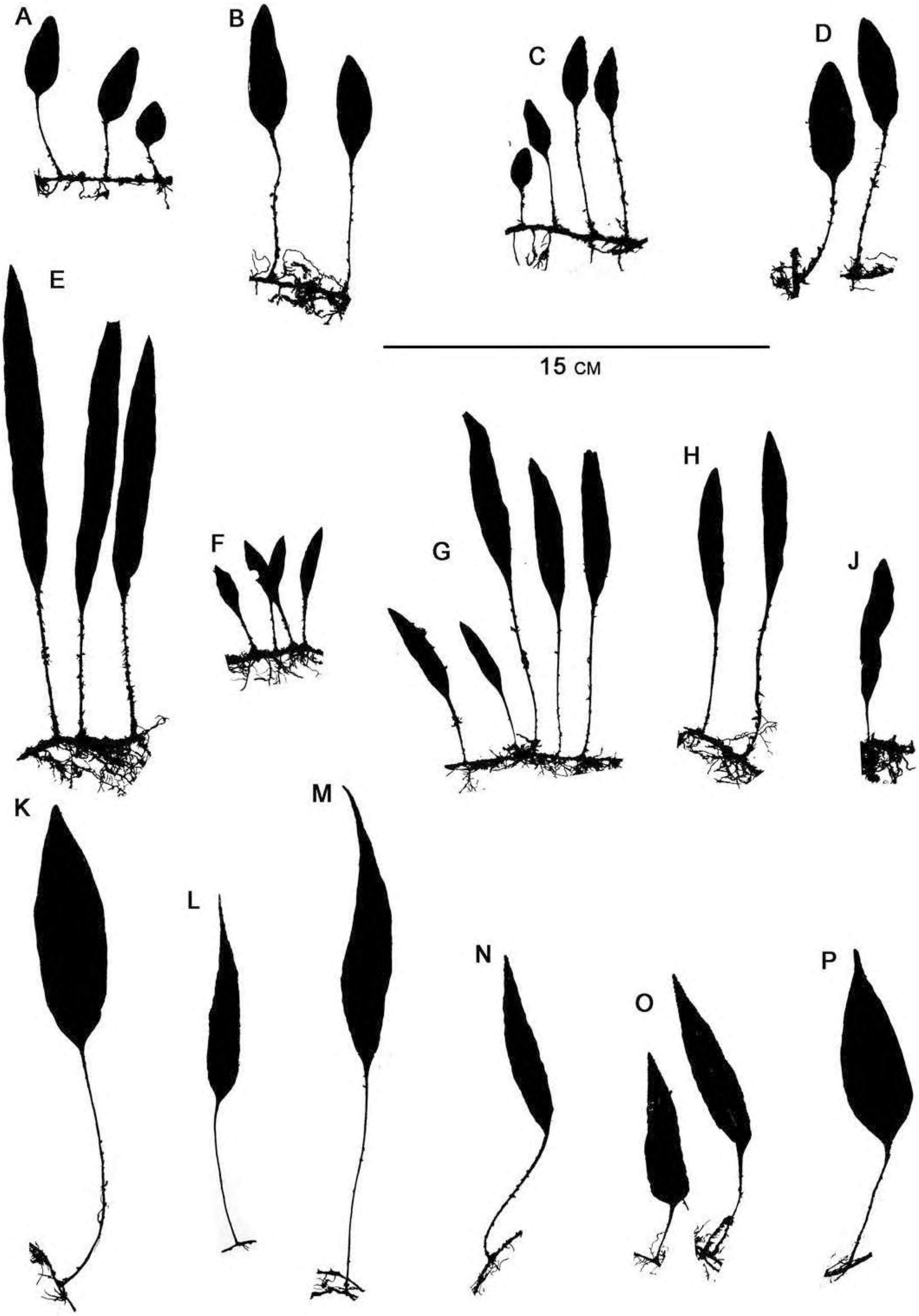

Figure 10. Silhouettes of three species of *Elaphoglossum* sect. *Squamipedia* Mickel & Atehortúa. A–D. *Elaphoglossum squamipes* (Hook.) T. Moore. E–J. *Elaphoglossum minutum* (Pohl ex Fée) T. Moore. K–P. *Elaphoglossum lloense* (Hook.) T. Moore. A from *Brade & Tamandaré 6447* (NY); B from *Bang 1791* (NY); C from *Davidse et al. 25834* (MO); D from *Rojas & Alfaro 4662* (MO); E from *Kessler et al. 8300* (NY); F from *Martínez-Salas & Stevenson 23981* (NY); G from *Moran et al. 6206* (NY); H from *Proctor 22170* (NY); J from *Mickel 7326* (NY); K from *Franco et al. 2883* (MO); L from *Dorr & Barnett 8249* (NY); M from *Hagemann 660* (COL); N from *Núñez 404* (MO); O from *Holm-Nielsen et al. 5657* (AAU); P from *Núñez 51* (MO).

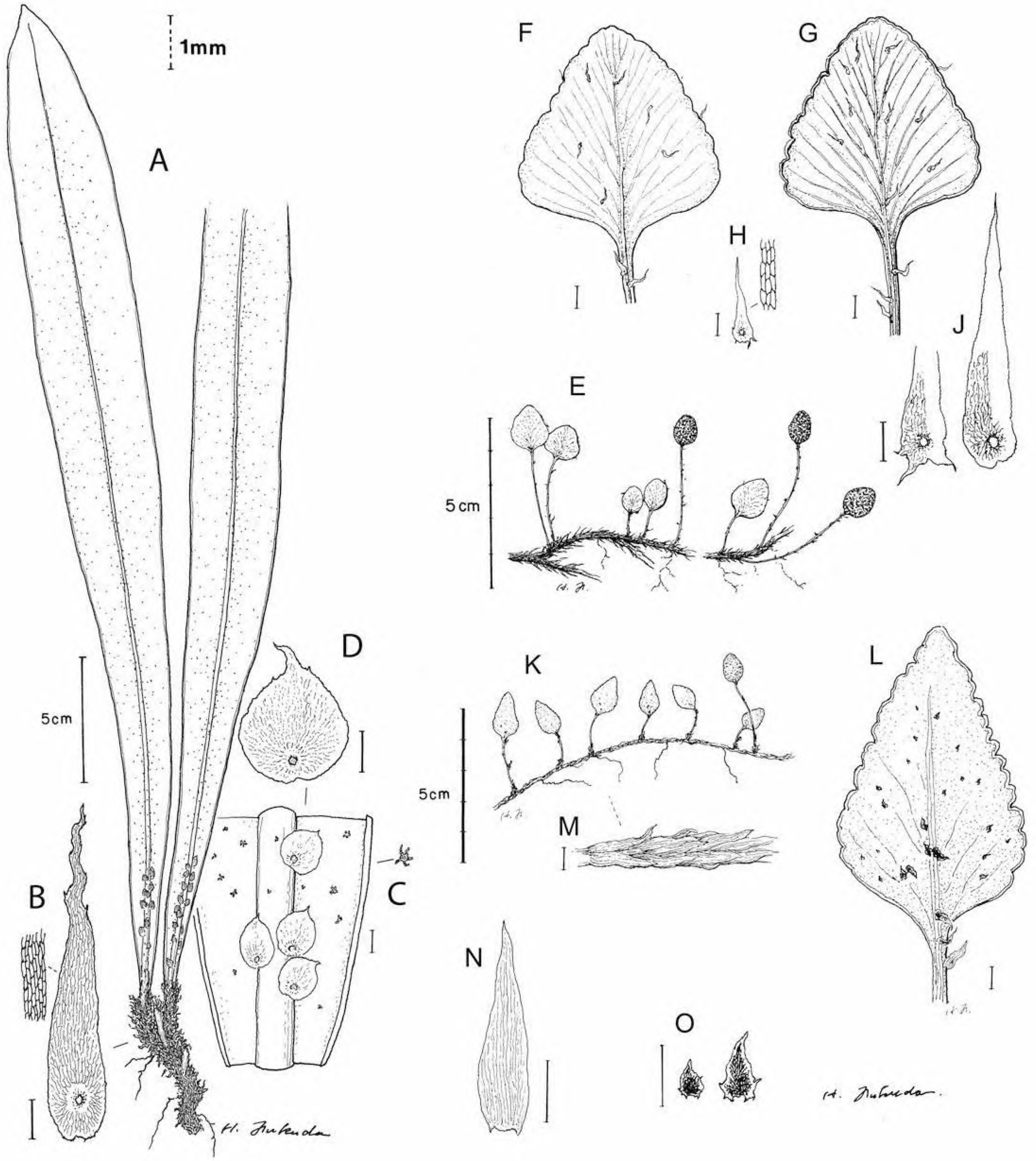

Figure 11. A–D. *Elaphoglossum nidiforme* Mickel. —A. Habit. —B. Rhizome scale. —C. Base of sterile lamina, abaxial surface, with detail of microscale at right. —D. Rachis scale from abaxial surface of costa. E–J. *Elaphoglossum rhomboideum* A. Vasco, Mickel & R. C. Moran. —E. Habit, showing three dimorphic and taller fertile leaves to right. —F. Adaxial lamina. —G. Abaxial lamina. —H. Petiolar scale. —J. Rhizome scales. K–O. *Elaphoglossum andreanum* Christ. —K. Habit, with one fertile leaf at right. —L. Abaxial lamina. —M. Rhizome. —N. Rhizome scale. —O. Abaxial laminar scales. A–D from *Lehnert & Kessler 1316* (NY); E–J from *Alston 8235* (MO); K–O from *André 3114* (NY). All habit illustrations conform to the 5-cm scale bar; all other scale bars equal 1 mm.

*Additional specimens examined.* ECUADOR. **Chimborazo:** ca. 5 km N of Huigra, Cañon of Río Chanchan, *Camp E-3419* (NY). **Cotopaxi:** Cantón Pujilí, along rd. betw. El Corazón & Angamarca, along side rd. to Yasaucho, 0.3–0.4 km off of main rd., 3.1 km above main square in El Corazón, *Croat 73680* (MO, QCNE); around Pilalo, *Holm-Nielsen & Jeppesen 1365* (AAU, GH).

**8. Elaphoglossum feei** (Bory ex Fée) T. Moore, Index Fil. 16: 356. 1857. Basionym: *Acrostichum feei* Bory ex Fée, Mém. Foug. 2: 48, tab. 18, fig. 2. 1845. TYPE: Guadeloupe. Near bains chauds de Matouba, [16°02′N, 61°41′W], 1844, *de Thiouville s.n.* (holotype, P!, P photos GH!, US!). Figures 6B, 15D, E.

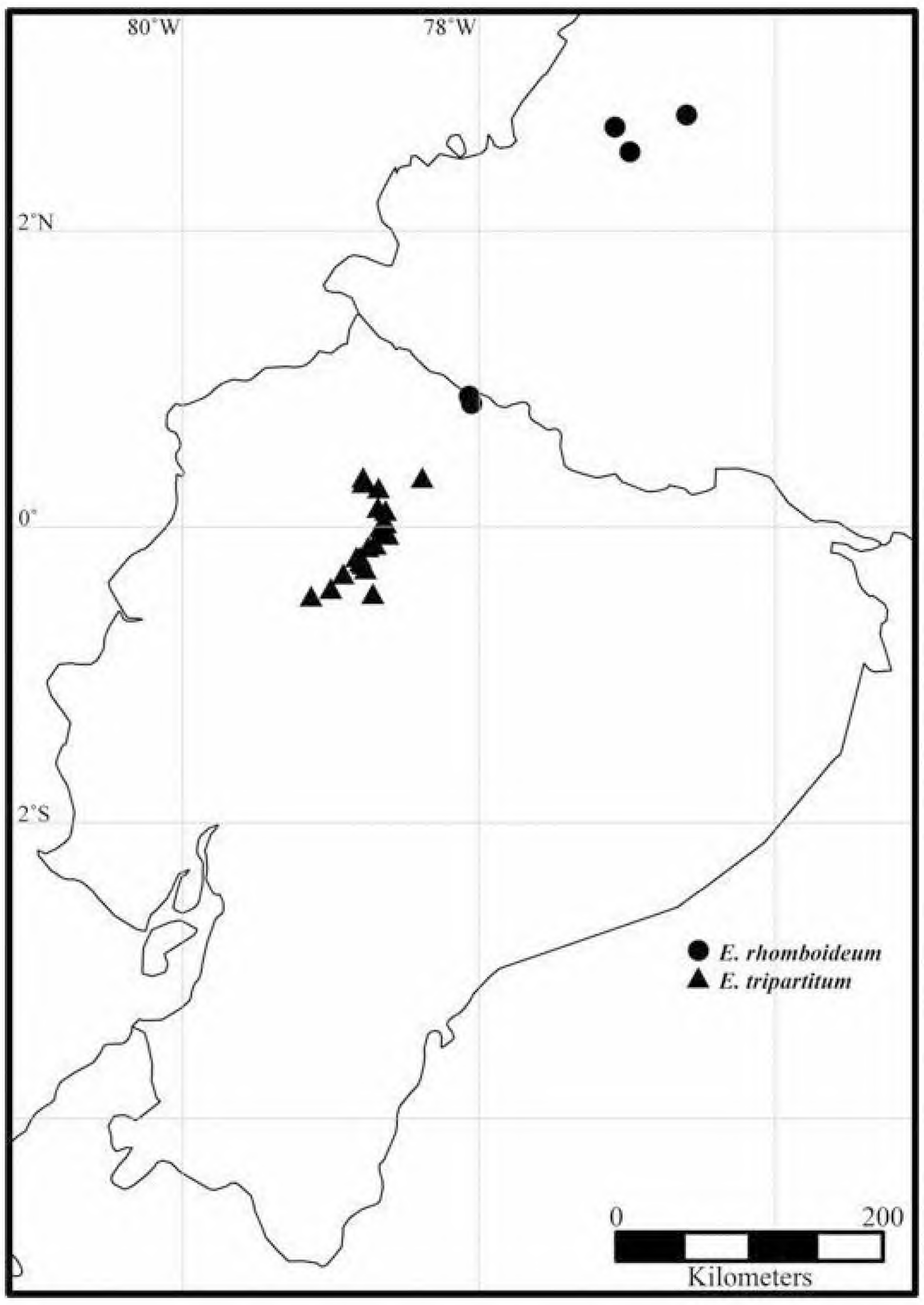

Figure 12. Distribution map of *Elaphoglossum rhomboideum* A. Vasco, Mickel & R. C. Moran (●) and *E. tripartitum* (Hook. & Grev.) Mickel (▲).

Rhizomes 0.6–1 mm wide, long-creeping; rhizome scales 1.4–2.8 mm, appressed, lanceolate, entire, light orange to brown, dull. Sterile leaves 3–9.5 cm; petioles 0.2 to 0.5 times the lamina length; petiolar scales 1–2 mm, scattered, lanceolate, entire, brown, concolorous; laminae 2–6 × 0.3–0.8 cm, 3.8 to 9.1 times longer than wide, chartaceous, simple, narrowly elliptical, margins crenulate, apices acute to obtuse, bases narrowly cuneate, often decurrent to the petiole base; adaxial lamina surface glabrous; abaxial lamina surface with scattered scales, the scales 0.2–0.5 mm, stellate to laceolate, orange to light brown, dull. Fertile leaves 4–8.5 cm; petioles 2.5 to 4 times the lamina length; laminae 0.8–2 × 0.2–0.5 cm, narrowly elliptic to lanceolate, entire to faintly crenulate, apices acute to rounded, bases cuneate; intersporangial scales absent.

*Distribution and elevation.* *Elaphoglossum feei* is found in Guadeloupe and Dominica, at elevations from 750 to 1200 m.

*Discussion.* *Elaphoglossum feei* is characterized by short petioles, narrowly elliptic laminae with crenulate margins, and laminae that are 3–8 mm wide. The abaxial laminar scales are entire, lacking the basal projections on the margins that are present in other species of *Elaphoglossum* sect. *Squamipedia*. Superficially, *E. feei* resembles *E. wrightii*, a Cuban endemic originally placed in *Elaphoglossum* subsect. *Feeana* Christ [in *Elaphoglossum* sect. *Squamipedia*] by Mickel and Atehortúa (1980). *Elaphoglossum wrightii* differs from *E. feei* by larger and widely elliptic or oblanceolate laminae (Fig. 15F–J). *Elaphoglossum wrightii* is here excluded from *Elaphoglossum* sect. *Squamipedia* on the basis of chloroplast sequence data (Vasco et al., in prep.; see Excluded Species).

*Additional specimens examined.* DOMINICA. Mt. Anglais, *Hodge 22* (NY); Mt. Diablotin, *Hodge 2790* (GH, NY); Morne Anglais, *Hodge 2297* (GH, NY); pont Cassè, part way up Mt. Trois Pitons, *Lellinger 633* (US); Laudat, *Lloyd 150* (NY); Mt. Diablotin, *Lloyd 890* (NY); Mt. Diablotin, NW ridge, *Webster 13340* (GH, US).

GUADELOUPE. Matouba, Arins Chauds, ravine a Dejeuner, *Duss 4135* (F, GH, MO, NY); 1862, *L'Herminier s.n.* (GH, NY, US); bains-Jaunet, savane aux ananas, *Stehlé 1791* (NY, US).

**9. Elaphoglossum lloense** (Hook.) T. Moore, Index Fil. 11: 360. 1857. Basionym: *Acrostichum lloense* Hook., Icon. Pl. tab. 657. 1844. TYPE: Ecuador. Pichincha: valley of Lloa, [0°15′S, 78°35′W], *W. Jameson s.n.* (holotype, K!; isotype, P!, P photo F!). Figures 3S, T, 6B, 10K–P, 14.

*Elaphoglossum ensiforme* Mickel, Fieldiana, Bot., n.s. 27: 131. 1991. TYPE: Peru. Cuzco: Urubamba, Machu Picchu, Liactapampa, below Palcay on Aobamba river, [13°09′S, 72°31′W], 3300 m, 7 July 1982, *S. Peyton & T. Peyton 814* (holotype, MO!, MO photo NY!).

*Elaphoglossum rhynchophyllum* Christ, Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 36: 57, fig. 20. 1899. TYPE: Venezuela. Mérida: [8°51′S, 70°44′W], 1889, *Engel 118* (holotype, P!).

*Elaphoglossum serpentinum* A. Rojas & W. D. Rodríguez, Actual. Biol. 34: 178. 2012. TYPE: Colombia. Antioquia: Municipio de Ituango, Km. 12.5 of rd. La Granja–Santa Rita de Ituango, 7°12′N, 75°42′W, 1930 m, 12 May 1988, *J. Zarucchi & J. Betancur 6484* (holotype, HUA!; isotype, MO).

*Elaphoglossum teleglottis* Mickel, Novon 2: 381. 1992. TYPE: Panama. Chiriquí: Distrito Bugaba, Cerro Punta, around STRI house, 8°51′S, 70°44′W, 2200 m, 27 Jan. 1984, *H. van der Werff & J. Herrera 6503* (holotype, NY!; isotypes, MO!, UC!).

Rhizomes 1–2 mm wide, long-creeping; rhizome scales 2–5 mm, appressed, ovate to narrowly lanceolate, irregularly and minutely toothed, light orange to dark brown, concolorous to darkened medially with broad lustrous dark brown to black central streak, dull. Sterile leaves 6–25 cm; petioles

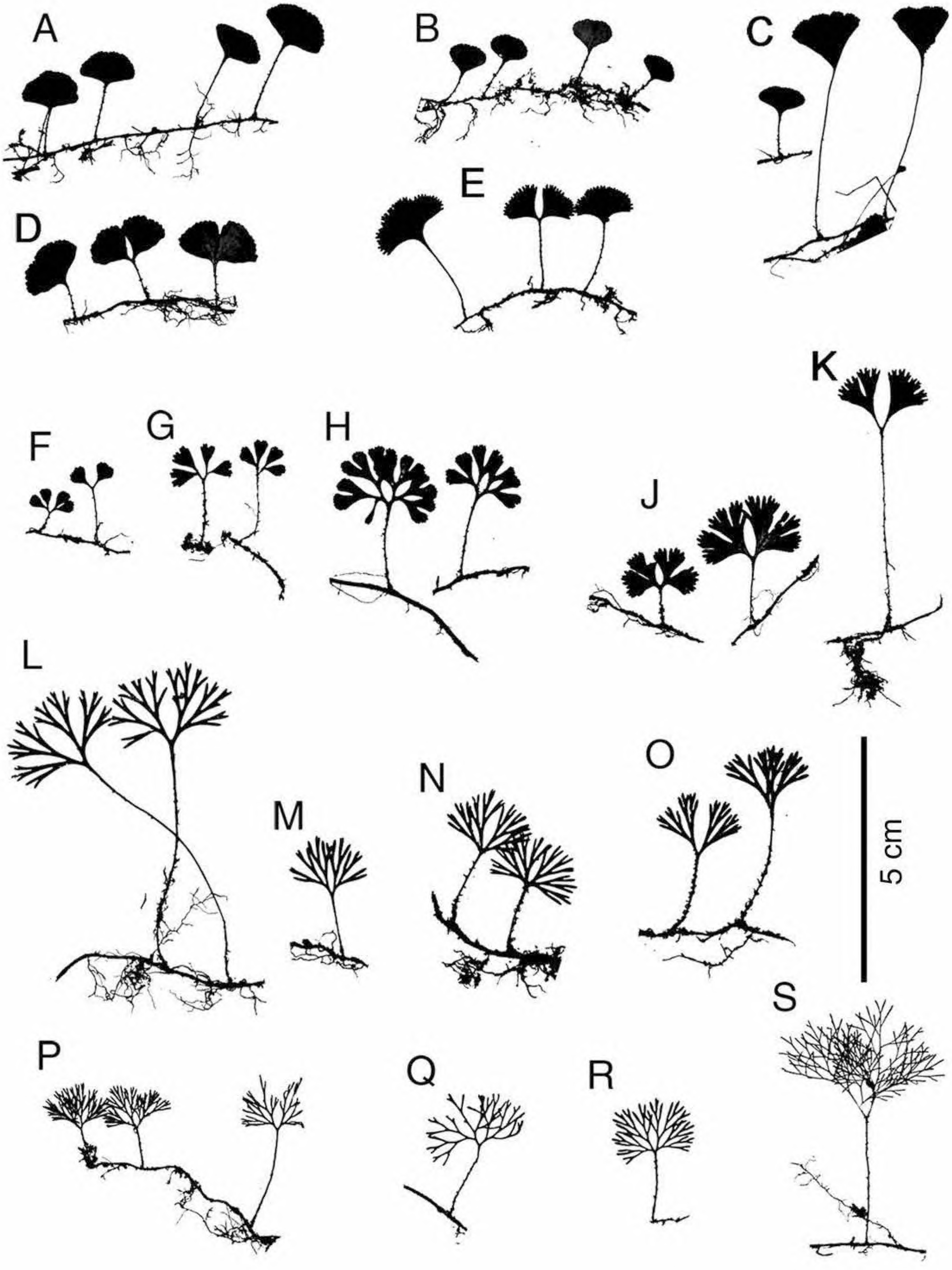

Figure 13. Silhouettes of the three forms of *Elaphoglossum peltatum* (Sw.) Urb. A–C. *Elaphoglossum pelatum* f. *standleyi* (Maxon) Mickel. D–K. *Elaphoglossum peltatum* f. *flabellatum* (Humb. & Bonpl. ex Willd.) Mickel. L–S. *Elaphoglossum peltatum* (Sw.) Urb. f. *peltatum*. A from *Fay & Fay 3604* (NY); B from *Wagner 78631* (NY); C from *Øllgaard et al. 35600* (AUU); D from *Folsom et al. 6677* (AAU); E from *Steyermark et al. 126785* (MO); F from *Churchill et al. 4839* (MO); G from *McPherson 9529* (MO); H from *Alfaro 523* (NY); J from *Correa et al. 8586* (NY); K from *Ortega & van der Werff 2356* (MO); L from *Gastony et al. 240* (NY); M from *Barbor s.n.* (NY); N from *Giraldo-Cañas 379* (MO); O from *Mickel 8884* (NY); P from *Luteyn et al. 10693* (NY); Q from *Smith et al. 5959* (MO); R from *Croat & Watt 70389* (MO); S from *Laegaard 51596B* (AAU).

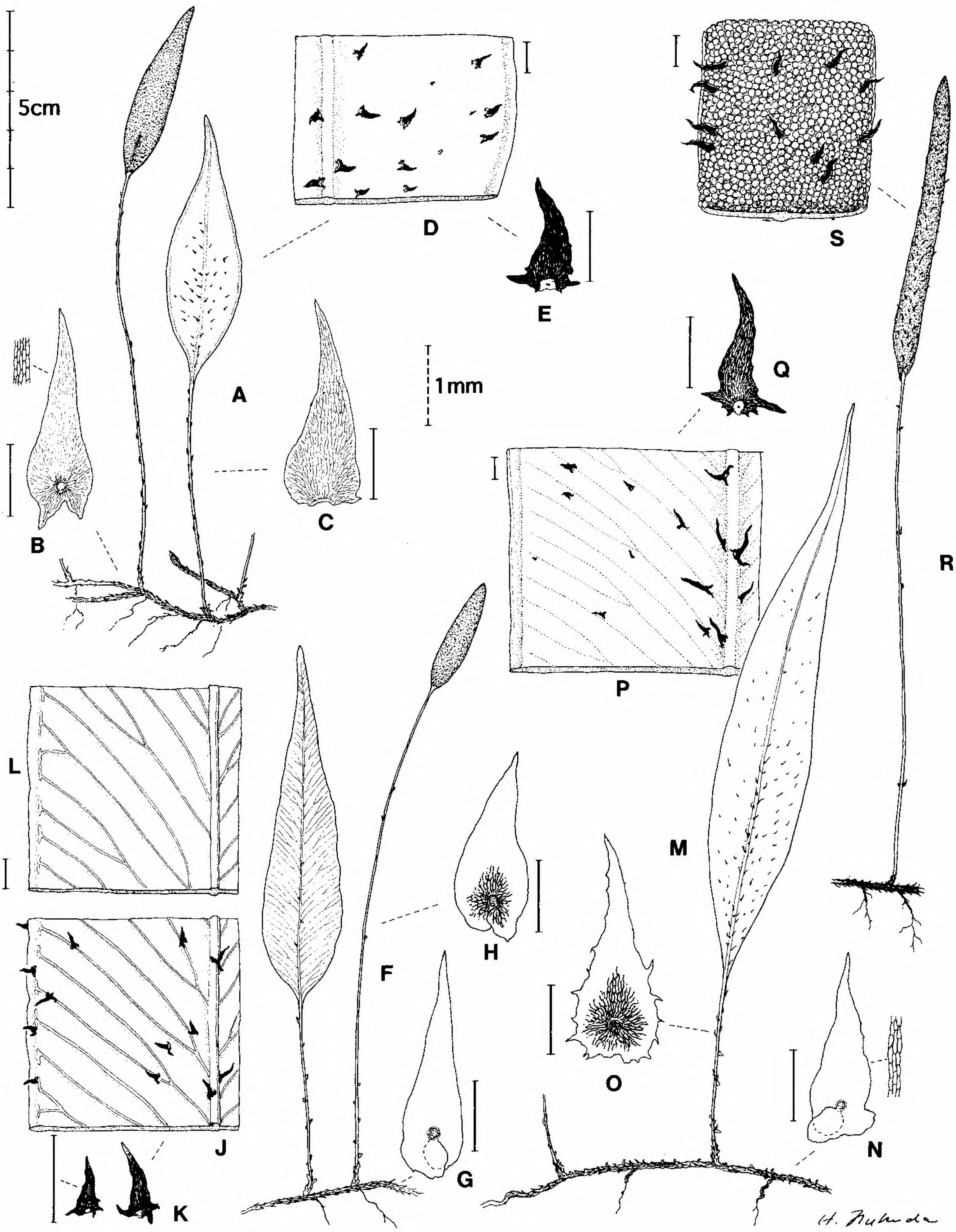

Figure 14. A–S. *Elaphoglossum lloense* (Hook.) T. Moore showing differences in sterile leaf shapes and sizes. —A. Habit, with fertile leaf at left. —B. Rhizome scale. —C. Petiolar scale. —D. Adaxial lamina detail. —E. Laminar scale. —F. Habit, with fertile leaf at right. —G. Rhizome scale. —H. Petiolar scale. —J. Abaxial lamina detail. —K. Abaxial laminar scales. —L. Adaxial lamina detail. —M. Habit. —N. Rhizome scale. —O. Petiolar scale. —P. Abaxial lamina detail. —Q. Abaxial laminar scale. —R. Fertile leaf. —S. Fertile lamina detail. A–E from *Sodiro s.n.* (AAU); F–L from *Dorr et al. 7301* (NY); M–Q from *Navarrete & Asimbaya 1644* (NY); R, S from *Steyermark & Liesner 118353* (NY). All habit illustrations conform to the 5-cm scale bar; all other scale bars equal 1 mm.

0.5 to 2.5 times the lamina length; petiolar scales 1.5–4 mm, scattered, ovate to ovate-attenuate, entire, brown, concolorous or darkened at point of attachment; laminae 2–15 × 1.1–2.8(–4) cm, (2 to)3 to 14 times longer than wide, chartaceous, simple, lanceolate to narrowly elliptic, margins entire or (especially small laminae) minutely crenulate, apices attenuate, acute to acuminate, bases cuneate to rounded; adaxial lamina surface scaly, the scales (0.3–)1–2.5 mm, minute and circular to large and narrowly lanceolate, light brown to black, dull or shiny, the apices attenuate, irregularly toothed or with occasional processes, sometimes hastate; abaxial lamina surface scaly, the scales (0.3–)1–2 mm, like those adaxially. Fertile leaves 7–27.5 cm; petioles 2.2 to 4.3 times the lamina length; laminae 1.5–7.5 × 0.5–1.2 cm, ovate to narrowly lanceolate, entire, apices acuminate to attenuate, bases cuneate to long-tapering; intersporangial scales absent or if present 1–2 mm, narrowly lanceolate, toothed or with lateral processes, brown to black.

*Distribution and elevation.* *Elaphoglossum lloense* is epiphytic in wet forests of Bolivia, Colombia, Costa Rica, Ecuador, Panama, Peru, and Venezuela; specimens have been collected at elevations of (350–)900–3700 m.

*Discussion.* Compared to other species in the section, *Elaphoglossum lloense* has larger sterile leaves that are 6–25 cm long and 1.1–2.8(–4) cm wide, often with acute or long-attenuate apices. The latter (apex) character will often serve to distinguish the species from those with a similar general leaf shape, such as *E. minutum* (Pohl ex Fée) T. Moore and *E. squamipes* (Fig. 10). Nevertheless, *E. lloense* varies greatly in size and shape of the laminae, especially in lamina width and the angle of tapering toward the base (Fig. 14). Small leaves (< 3 cm long) appear quite different from larger ones, often with laminae elongate to deltate, minutely crenulate, and abruptly contracted and decurrent at the base (Fig. 2E–H). Such leaves greatly resemble those of small species (e.g., *E. andreanum*), but can generally be distinguished by the thinner texture with more evident venation in *E. lloense*. The laminar scales are also extremely variable in color and shape, varying from pale brown to black, and minute and circular to large and hastate. Although quite distinct, these extremes intergrade and can sometimes be found on the same plant. Specimens from Costa Rica and Panama with narrow, hastate pale brown scales have been recognized as *E. teleglottis*, but these appear to be part of the variation within the species and are greatly similar to Andean plants. Molecular phylogenetic analyses using sequence data from three chloroplast markers resolved *E. lloense*, as here circumscribed, as two different clades not sister to each other (Vasco et al., in prep.). Because the plants in the two clades are indistinguishable morphologically, we prefer to treat them under the same name for now.

*Additional specimens examined.* BOLIVIA. **Cochabamba:** Prov. Carrasco, Siberia Este, Monte Hotel, *Fernández-Terrazas et al. 2537* (MO); Incachaca, *Steinbach 5870* (K, NY); Prov. Chapare, Incachaca-Chusi, *Steinbach 9211* (GH, MO, NY). **La Paz:** Prov. Nor Yungas, Est. Biol. Tunquini, senda paralela al camino principal a la mina hasta el pantano, *Bach 1881* (NY, UC); Chapare, along rd. toward Villa Tunari from Cochabamba, *Luer et al. 8682* (NY, SEL); Prov. Nor Yungas, 1.9 km NE of Chuspipata on the rd. to Coroico, *Solomon 14929* (MO, NY). **Santa Cruz:** Prov. Manuel María Caballero, camino a Siberia, 26 km de Comarapa, *Jordán & Vargas 338* (MO, NY, USZ); Prov. Manuel María Caballero, camino a Siberia, 26 km de Comarapa, *Jordán & Vargas 373* (MO, USZ).

COLOMBIA. **Antioquia:** Mpio. Jardín, vereda La Sesenia, sector La Orqueta, *Rodríguez et al. 4988* (HUA, NY); Mpio. Medellín, Correg. San Antonio de Prado, Alto del Silencio, vereda Potrerito, *Vasco 512* (HUA, MO, NY). **Boyacá:** margen del río Cusiana, finca Comijoque, *Hagemann 660* (COL); Cordilla Oriental, Vertiente W, carretera Sogamoso-Pajarito, valle del río Cusiana, *Jaramillo-M. et al. 3773* (COL). **Cauca:** Km. 62 on rd. from Tortoro to Inza, E of páramo de Guanacas, *Barrington 496* (COL). **Cundinamarca:** Patio Bonito, Batatas Valley, cordillera de Heliconia, 12 km SE of Gachalá, *Grant 10210* (COL, HUA). **Huila:** cordillera Oriental, Caquetá side of Huila–Caquetá divide, 20 km SE of Garzón, *Little 9377* (COL, F, GH). **Meta:** Mpio. Acacías, cordillera Oriental, Colonia Penal y Agrícola de Oriente, *Jaramillo-M. 7430* (COL); Mpio. San Juanito, PNN Chingaza, cañón del río Guajaro, *Vasco et al. 779* (HUA, NY). **Nariño:** carretera La Victoria (inspección de Policía Mpio. Ipiales)–Monopamba, Km. 32, Motilón, *Hagemann & Leist 1846* (COL); Mpio. Pasto, río San José, parte alta del río Bobo, *Ramírez & Cuayal 3848* (COL). **Putumayo:** above Sibundoy, *Alston 8375* (NY); páramo Quilinsayaco, *Hagemann & Leist 1997* (COL). **Risaralda:** Mpio. Pereira, orilla del camino entre Ceylan y el Cedral, *Franco et al. 2883* (COL); Mpio. Pueblo Rico, vereda Montebello, cerca de los Cajones, subiendo hacia la base militar, *Vasco et al. 646* (HUA, NY). **Valle del Cauca:** Mpio. El Cairo, cordillera Occidental, Serranía de los Paraguas, cerro del Inglés, *Silverstone-Sopkin et al. 2954* (NY).

COSTA RICA. **Puntarenas:** Cantón de Coto Brus, Zona Protectora Las Tablas, Cuenca Terraba-Sierpe, Sitio Coto Brus, *A. Rojas & E. Navarro 4350* (NY); same locality, *A. Rojas et al. 4923* (NY).

ECUADOR. **Azuay:** forested slopes betw. Sta. Cruz Pamba & Loma de Canela, in region of Río Sadracay, tributary of Río Mehuir, N of Melleturno, *Steyermark 52964* (F). **Bolivar:** bosque protector Cashca-Tooras, SE of Santiago, *Øllgaard & Navarrete 2077* (AAU); Simiatug, Had. Talahua, *Penland & Summers 651* (F). **Carchi:** valle de Maldonado, Km. 53 on rd. Tulcán–Maldonado, *Holm-Nielsen et al. 5657* (AAU, MO, UC); near encampment in Gualpi Chico area of Awá Reserve, *Hoover et al. 2897* (MO, QCA); rd. Tulcán–Maldonado, 49 km from Tulcán,

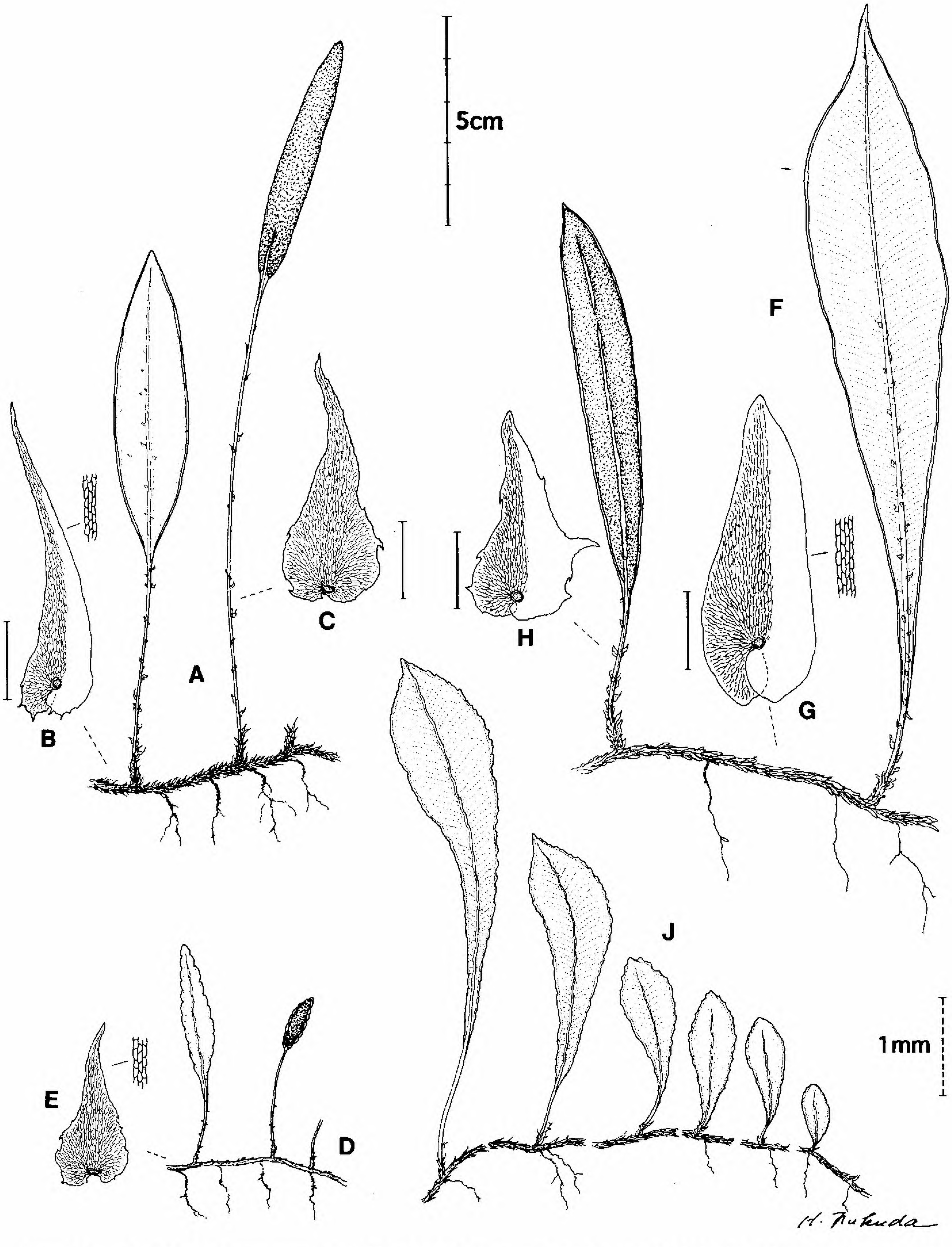

Figure 15. A–C. *Elaphoglossum minutum* (Pohl ex Fée) T. Moore. —A. Habit, with fertile leaf at right. —B. Rhizome scale. —C. Petiolar scale. D, E. *Elaphoglossum feei* (Bory ex Fée) T. Moore. —D. Habit, with fertile leaf at right. —E. Rhizome scale. F–J. *Elaphoglossum wrightii* (Mett. ex D. C. Eaton) T. Moore. —F. Habit, with one fertile leaf at left. —G. Rhizome scale. —H. Petiolar scale. —J. Heteroblastic leaf series. A–C from *Woodson Jr. et al. 1177* (NY); D, E from *Stehlé 2406* (NY); F–H from *Ekman 3882* (NY); J from *Shafer 4131* (NY). All habit illustrations conform to the 5-cm scale bar; all other scale bars equal 1 mm.

*Øllgaard & Balslev 8334* (AAU, NY, QCA, UC). **Chimborazo:** rd. ca. 10 km NE of Alao, at Chuspipaccha, *Øllgaard et al. 38174* (AAU). **Imbabura:** Reserva Cotacachi–Cayapas, bosque protector Neblina, *Vasco et al. 865* (NY, QCA). **Loja:** Par. Nac. Podocarpus, above Nudo de Cajanuma, *Øllgaard et al. 74480* (AAU), *75008* (AAU, NY, QCA, QCNE); El Tiro, shrubby páramo along rd. Loja-Zamora, at highest point, ca. 10 km from Loja, *van der Werff et al. 19596* (MO, QCNE, UC). **Los Ríos:** summit of Cerro Samama (Hda. Clementina), S of rd. Caluma–Catarama, *Øllgaard & Navarrete 2049A* (AAU). **Morona-Santiago:** rd. Sta. Susana de Chiviasa-Panecillo, Km. 3–4, *Øllgaard & Navarrete 2658* (AAU, QCA), *2700* (AAU, QCA). **Napo:** camino Oyacachi–El Chaco, sector río Chalpi, ca. 15 km al E del pueblo, *Navarrete & Asimbaya 1644* (AAU, NY, QCA); Oyacachi, ca. 2 km below village, opposite abandoned village, Casajuchu, *Øllgaard & Navarrete 1222* (AAU, NY, QCA). **Pastaza:** rd. N of Mangayacu, Km. 1.8 W of Mera, disturbed forest along stream, *Øllgaard & Navarrete 105660* (AAU); rd. N of Mera, toward Río Anzu, Km. 6.7, *Øllgaard & Navarrete 105675* (NY, QCA). **Pichincha:** Salvador, ca. 25 km W of Quito, *Bell 665* (GH); Km. 17, Nono–Tandayapa, along Río Alambi, *Dodson & Clendenin 10815* (QCNE); Mt. Pululahua, *Mille 200* (COL); Mt. Pululahua, *Mille s.n.* (NY). **Tungurahua:** W of Río Guambi, ca. 7 km along rd. & trails S of Río Negro, *Øllgaard & Navarrete 3050* (AAU, QCA). **Zamora–Chinchipe:** Est. Científica San Francisco, study plot A9, along trail T1 above refuge, *Lehnert 1491* (NY, UC); Est. Científica San Franciso, ca. 35 km from Loja on rd. Loja–Zamora, quebrada de Milagro along T4, *Mendieta 162* (NY); Par. Nac. Podocarpus, rd. Yangana–Valladolid, just S of the pass (Nudo de Sabanilla), *Øllgaard 90658* (AAU).

PERU. **Cusco:** Urubamba, Machu Picchu, Llactapampa, a small pampa below palcay on the Aobamba river, *Peyton & Peyton 1100* (MO); Calca, rd. quebrada Alto Lacco, *van der Werff et al. 21197* (MO, UC). **Pasco:** Oxapampa, Distr. Huancabamba, sector Sta. Barbara–Milpo, *Mellado et al. 2767* (MO, USM); Oxapampa, Distr. Villa Rica, bosque de la reserva municipal El Sho'llet, Abra Villa Rica, *Mellado et al. 2981* (MO, UC, USM), *Mellado et al. 3026* (HUT, MO, NY, UC, USM).

VENEZUELA. **Aragua:** Colonia Tovar, *Fendler 286* (GH, K, MO, NY); Par. Nac. Henry Pittier, trail above Guamitas to summit of La Mesa, above El Limón, *Steyermark 89850* (GH, NY); Carretera Los Anaucos/Costa de Maya–Colonia Tovar, Monumento Nat. Pico Codazzi, *Vasco 845* (NY, VEN). **Táchira:** along quebrada Agua Azul, S of Reposo, 14 km SE of Delicias, *Steyermark & Liesner 118353* (MO, NY). **Trujillo:** Mpio. Boconó, Par. Nac. Guaramacal, páramo de Guaramacal, SW of the television antennas, *Stergios et al. 20664* (MO, NY), *20728* (MO, NY). **Vargas:** Monumento Nat. Pico Codazzi, *Mostacero et al. 325* (UC), *326* (UC), *355* (UC), *506* (UC).

**10. Elaphoglossum minutum** (Pohl ex Fée) T. Moore, Index Fil. 12: 361. 1857. Basionym: *Acrostichum minutum* Pohl ex Fée, Mem. Foug. [Hist. Acrost.] 2: 39, tab. 10, fig. 3. 1845. TYPE: Brazil. Goiás: "circa Goyaz," [15°55′S, 50°57′W], s.d., *J. B. E. Pohl 1432* (holotype, W!). Figures 6C, 10E–J, 15A–C.

*Elaphoglossum revolutum* (Liebm.) T. Moore, Index Fil. 365. 1862, syn. nov. Basionym: *Acrostichum revolutum* Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5, 1: 163. 1849. *Acrostichum revolutum* Liebm., Mexic. bregn. 163 (reprint 11). 1849, nom. illeg. TYPE: Mexico. Oaxaca: Chinantla, betw. Lobani & Petlapa, [17°28′N, 96°02′W], ca. 1000 m, s.d., *F. M. Liebmann s.n.* [Pl. Mex 2427, Fl. Mex. 4] (lectotype, designated by Mickel & Beitel [1988: 181], C!; isolectotypes, BM!, BM fragm. NY!, US!).

*Elaphoglossum rampans* (Baker) Christ, Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 36: 56. 1899, syn. nov. Basionym: *Acrostichum rampans* Baker, Syn. fil. (ed. 2): 518. 1874. TYPE: Cuba. Oriente, 1865, *C. Wright 3959* (holotype, K!; isotypes, NY! [2], P!).

*Elaphoglossum elegantulum* Rosenst., Repert. Spec. Nov. Regni Veg. 10: 280. 1912, syn. nov. TYPE: Costa Rica. San José: San Cristobal, [9°47′N, 84°01′W], 1500 m, Aug. 1910, *C. Wercklé s.n.* (holotype, S!, S photos BM!, NY!).

*Elaphoglossum macilentum* Mickel, Fieldiana, Bot., n.s. 27: 144. 1991, syn. nov. TYPE: Peru. Madre de Dios: Prov. Manú, Par. Nac. Manú, Río Manú, Río Cumerjali, 71°32′W, 11°49′S, 350–450 m, 22 Oct. 1986, *R. B. Foster 11978* (holotype, F!, F photo NY!).

*Elaphoglossum xiphoides* Mickel, Ann. Missouri Bot. Gard. 78: 259–260, fig. 1C. 1991, syn. nov. TYPE: Venezuela. Bolívar: cuenca media del río Paragua, 06°03′N, 63°47′W, 13 June 1987, *B. Stergios 10310* (holotype, NY!; isotype, MO!).

Rhizomes ca. 1 mm wide, long-creeping; rhizome scales 1.5–3 mm, appressed, ovate-lanceolate, entire, light orange to brown, concolorous, dull. Sterile leaves 4.5–19.5 cm; petioles 0.3 to 0.8 times the lamina length; petiolar scales 1–2 mm, clasping to slightly spreading, ovate, entire or with small marginal projections, light orange to brown, dull; laminae 2.5–13.5 × 0.5–2.1 cm, 3.8 to 11 times longer than wide, coriaceous, simple, narrowly elliptic to oblong, usually widest at or above the middle and parallel-sided medially, margins entire, apices obtuse, bases cuneate; adaxial lamina surface scales absent; abaxial lamina surface scales absent or sparse and only near the costa, the scales 1–3 mm, ovate, brown, dull. Fertile leaves 6–18 cm; petioles (0.8 to)1.8 to 3.3 times the lamina length; laminae 2–9.5 × 0.4–1 cm, oblong, entire; intersporangial scales absent.

*Distribution and elevation. Elaphoglossum minutum* occurs in Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Peru, and Venezuela, at elevations of 100–1000(1700) m.

*Discussion. Elaphoglossum minutum* has the lowest elevational range of any species of *Elaphoglossum* sect. *Squamipedia*, being found typically from 100 to 1000 m in elevation. It resembles *E.*

*squamipes* and *E. lloense* in lamina shape (Fig. 10) and, like them, is widespread in tropical America. It differs from both species by the relatively shorter petioles of the sterile leaves and laminae that tend to be more oblong and parallel-sided in the middle. From *E. squamipes* it further differs by its generally narrowly elliptic laminae (instead of the ovate-lanceolate laminae of *E. squamipes*).

The name *Elaphoglossum minutum* has often been misapplied (e.g., by Mickel, 1991, 1995a, 1995b) to *E. gayanum* (Fée) T. Moore, a species belonging to *Elaphoglossum* sect. *Lepidoglossa* Christ. *Elaphoglossum minutum* and *E. gayanum* are superficially similar in their laminae, which are slightly coriaceous and typically oblong and parallel sided in the middle. *Elaphoglossum gayanum*, however, differs by terrestrial habit, presence of phyllopodia, short-creeping rhizomes, and rhizome scales with sclerotic stripes (vs. epiphytic habit, no phyllopodia, long-creeping rhizomes, and concolorous rhizome scales in *E. minutum*). In herbaria, specimens of *E. gayanum* are often also identified as *E. leptophyllum* (Fée) T. Moore, a synonym of *E. gayanum*.

*Additional specimens examined.* BOLIVIA. **Beni:** Prov. Ballivián, 16 km por el camino maderero, 12 km de Yucumo a Rurrenabaque, *Kessler et al. 10944* (UC). **Cochabamba:** Prov. José Carrasco Torrico, Par. Nac. Carrasco, al S del Campamento Petrolero Ichoa, *Aceby 490* (NY); Prov. Chapare, Par. Nac. Carrasco, cavernas del Repechón, *Kessler et al. 8300* (NY, UC). **La Paz:** Prov. Sud Yungas, *Krömer & Acebey 298* (UC).

BRAZIL. **Goiás:** Goiania, *Brade 15379* (MO, NY, RB).

COLOMBIA. **Magdalena:** Sta. Marta, *Smith 2673* (F, GH, K, NY).

COSTA RICA. **Cartago:** Turrialba, near Interamerican Inst., *Scamman 5996* (GH). **Guanacaste:** Cantón de La Cruz, P. N. Guanacaste Volcán Orosí La Cruz, Martza, *Rojas et al. 3096* (MO, NY). **Puntarenas:** Cantón de Coto Brus, cuenca Terraba-Sierpe, Sabalito, Mellizas, finca Cafrosa, sendero ripario orillas río Quijada del Diablo, *Rojas et al. 4354* (MO, NY); Cantón de Coto Brus, cuenca Térraba-Sierpe, finca Cafrosa, orillas del río Negro, *Rojas et al. 4892* (MO).

CUBA. **Santiago de Cuba:** pico Turquino, arroyo Bayajá, Nagua region, *Ekman 14764* (NY); N spur of Sierra Maestra, W of Río Yao, *Morton & Acuña 3382* (GH, NY, UC); prope Monte Verde, *Wright 968* (GH). **Villa Clara:** Trinidad Mtns., near La Vega, E of Loma Ventana, *Webster et al. 240* (GH). **Unknown:** Oriente, arroyo Veintecineo, Los Organos, *Wright 1071* (GH, MO).

DOMINICAN REPUBLIC. **Santiago:** Distr. San José de las Matas. Jicomé, Loma del Medio, Jicomé, *Valeur 640* (F, GH, MO, NY). **Santiago Rodríguez:** N side of cordillera Central, arroyo Caña, 27 km SW of Cepillo part of Monción, 1 km past pueblo of Aguacate, *Mickel et al. 8601* (MO, UC).

ECUADOR. **Napo:** Añangu, S bank of Río Napo 95 km downstream from Coca, *Balslev et al. 60594* (AAU); Tiputini Biodiversity Station, *Köster et al. 871* (NY); outside of Par. Nac. Yasuni, ca. Km. 21 on Maxus Oil Company rd., transect 11, *Moran et al. 6206* (NY).

GUATEMALA. **Alta Verapaz:** Cerro Chinajá, betw. finca Yalpemech & Chinajá, above source of Río San Diego, *Steyermark 45613* (F); Cubilguitz, *von Tűrckheim 159* (GH). **Huehuetenango:** Cerro Victoria, across river from finca San Rafael, Sierra de los Cuchumatanes, *Steyermark 49613* (F, GH).

GUYANA. Region U. Takutu-U. Essequibo, Kassikaityu river, 0–5 km E of camp, *Clarke 4963* (NY).

HONDURAS. **Comayagua:** above El Achote, hills above the plains of Siguatepeque, *Yuncker et al. 6440* (GH, NY).

JAMAICA. **St. Elizabeth:** Gorge of Jones river, N of Ginger hill, *Proctor 22170* (GH, NY).

MEXICO. **Chiapas:** Mpio. Ocozocoautla de Espinosa, Selva de Ocote, 32 km NW of Ocozocoautla, *Breedlove 27432* (NY); Ocozocoautla de Espinosa, Selva del Ocote, 32 km NW of Ocozocoautla, *Breedlove 27432* (F, MO); Palenque, along Hwy. 199 from Palenque to Ocosingo, 43 mi. SW of Palenque, *Croat 40328* (MO, UC); Ocosingo, en laguna Ocotalito, a 12 km al NE de Monte Líbano camino a Chancala, *Martínez-Salas & Soto 18661* (F); Ocosingo, a 3 km al S de Naja, camino a Palenque, *Martínez-Salas & Stevens 23981* (MO, NY). **Oaxaca:** Distr. Cuicatlán, vic. of Teutila, *Mickel 7326* (NY). **Veracruz:** region of San Andrés Tuxtla, near Zapoapan, SE of Catemaco, *Dressler & Jones 86* (GH); Mpio. Mecayapan, faldas del Volcán Sta. Marta, Ejido Plan Agrario, *Krömer & Otto 2873* (NY, UC).

PANAMA. **Chiriquí:** Boquete, *Davidson 746* (GH, MO); vic. of Boquete, *Woodson Jr. & Schery 765* (GH, MO); Distr. Boquete, finca Lérida to Boquete, *Woodson Jr. et al. 1177* (MO, NY).

**11. Elaphoglossum moorei** (E. Britton) Christ, Bull. Herb. Boissier, sér. 2, 3: 148. 1903. Basionym: *Acrostichum moorei* E. Britton, Mem. Torrey Bot. Club 4: 273. 1895. *Rhipidopteris rusbyi* Christ, Farnkr. Erde 46. 1897, nom. superfl., based on the same type gathering as *A. moorei*. *Elaphoglossum bangii* Christ, Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 36(1): 99, fig. 51. 1899, nom. superfl. *Microstaphyla bangii* (Christ) Hieron., Bot. Jahrb. Syst. 34: 539. 1904, comb. superfl. *Microstaphyla moorei* (E. Britton) Underw., Torreya 5: 88. 1905. *Peltapteris moorei* (E. Britton) L. D. Gómez, Brenesia 6: 30. 1975. TYPE: Bolivia. La Paz: Yungas, 1890, *M. Bang 558* (lectotype, designated by Mickel in Tryon & Stolze [1991], NY! [3]; isotypes, BM!, MO!, UC not seen, US!). Figures 6A, 7F–J, 8L.

*Elaphoglossum peruvianum* (L. D. Gómez) Mickel, Brittonia 32: 116. 1980. Basionym: *Peltapteris peruviana* L. D. Gómez, Rev. Biol. Trop. 18(1–2): 217, fig. 1. 1971. TYPE: Peru. Cuzco: alturas de Sicre, 3030 m, June 1924, *C. Bües 1572* (holotype, US!).

Rhizomes 0.6–0.9 mm wide, long-creeping; rhizome scales 1–2 mm, appressed, lanceolate, subentire, with occasional projections, light orange to brown, dull. Sterile leaves 3–17 cm; petioles about equaling the lamina length; petiolar scales 0.8–1.5

mm, scattered, clasping to spreading, ovate, with small marginal projections, brown; laminae 2–9 × 1.5–3 cm, 1.5 to 3.5 times longer than wide, chartaceous, pinnately divided, lanceolate to oblong, margins entire, apical segment similar to lateral ones, bases truncate, pinnae 0.4–1 mm wide, 8 to 17 pairs, spreading to ascending, sometimes notched or divided at the apex; adaxial lamina surface glabrous to sparsely scaly, the scales 0.1–0.5 mm, brown, sometimes darker at the point of attachment; abaxial lamina surface sparsely scaly, the scales 0.1–1 mm, with small marginal projections, brown, sometimes darker at point of attachment. Fertile leaves 6.5–13 cm; petioles 4 to 6 times the lamina length; laminae 1.6–3 × 0.4–0.5 cm, oblong, subentire to serrate or shallowly lobed, apices rounded, base truncate; intersporangial scales absent.

*Distribution and elevation.* *Elaphoglossum moorei* occurs in Bolivia and Peru, where it is epiphytic in cloud forests at elevations of 1400–2400 m.

*Discussion.* *Elaphoglossum moorei* and *E. colombianum* are the only Neotropical species of *Elaphoglossum* with laminae that are pinnately divided (Fig. 7). The number and width of the segments can distinguish them, with eight to 17 in *E. moorei*, but fewer (five to nine) in *E. colombianum*. Pinna bases are narrower in *E. moorei*, only to 1 mm widths, but range from 1 to 2 mm in *E. colombianum*. The two species are distinct geographically (Peru and Bolivia, *E. moorei*; restricted to Colombia, *E. colombianum*). Some specimens of *E. moorei* (cited below) bear laminae that are broadly cut and serrate to variously lobed (Fig. 8K). The variation in dissection suggests hybridity, but one of the specimens (*Vásquez et al. 30126*) has fertile leaves with well-formed spores, suggesting that these plants may not be hybrids. The exact nature of these plants still needs to be determined, but are accepted within *E. moorei*, pending further investigation.

*Additional specimens examined.* BOLIVIA. **Cochabamba:** Prov. Carrasco, exposición SW, *Fernández-Terrazas et al. 2419* (BOLV, MO); Prov. Chapare, *Steinbach 9301* (GH, MO, NY, UC). **La Paz:** Prov. Franz Tamayo, Par. Nac. Madidi, Mojos, campamento Fuertecillo, sobre la senda a Queara, *Cayola et al. 2847* (LPB, MO, NY, USZ); Prov. Franz Tamayo, Par. Nac. Madidi, Mojos, campamento inciensal Linter, 2 km al NW del campamento Fuertecillo (camino de herradura hacia Queara), *Fuentes et al. 11706* (LPB, MO).

PERU. **Cusco:** La Convención, Distr. Sta. Ana, Madre Selva, *Valenzuela et al. 3082* (CUZ, MO, UC); La Convención, Distr. Sta. Ana, Tunkimayo, *van der Werff et al. 21477* (MO, NY, UC). **Pasco:** Oxapampa, Distr. Villa Rica, bosque de la reserva municipal El Sho'llet, Abra Villa Rica, *Mellado et al. 3018* (AMAZ, HUT, MO, NY, UC, USM); Oxapampa, Distr. Huancabamba, P. N. Yanachaga-Chemillén, sector Quebrada Yanachaga, *Vásquez et al. 30581* (AMAZ, HUT, MO, MOL, NY, UC, USM); Oxapampa, Distr. Huancabamba, Par. Nac. Yanachaga-Chemillén, sector San Daniel, *Vásquez et al. 31008* (AMAZ, HUT, MO, NY, UC, USM).

*Specimens of Elaphoglossum moorei with irregularly cut laminae.* BOLIVIA. **Cochabamba:** Prov. Carrasco, Km. 117 on old rd. Cochabamba-Villa Tunari, *Kessler et al. 7078* (NY). **La Paz:** Prov. Nor Yungas, Chuspipata, sendero a la mina San Juan, *Lehnert 384* (NY).

PERU. **Cusco:** La Convención, Distr. Huayapata, San Cristóbal, *van der Werff et al. 21437* (MO, NY). **Pasco:** Oxapampa, Distr. Huancabamba, sector Milpo, *Vásquez et al. 30126* (MO, USM).

**12. Elaphoglossum nidiforme** Mickel, Fieldiana, Bot., n.s. 27: 148. 1991, as "*nidiformis*." TYPE: Peru. Madre de Dios: Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, [12°34′S, 71°15′W], 15 Dec. 1985, *R. B. Foster 10891* (holotype, F!; isotype, USM). Figures 9B, 11A–D.

Rhizomes ca. 10 mm wide, short-creeping to compact; rhizome scales 4–6 mm, spreading, ovate to lanceolate, entire or nearly so, orange to light brown, lustrous. Sterile leaves 30–37 cm; petioles 0.02 to 0.1 times the lamina length; petiolar scales 2–5 mm, speading, ovate, entire, light orange to brown, concolorous; laminae 28–35 × 4–5 cm, 4 to 6 times longer than wide, coriaceous, simple, narrowly oblanceolate, margins entire, apices acute, bases narrowly and gradually decurrent; adaxial lamina surface scales absent; abaxial lamina surface scales absent or, if present, the scales 0.2–0.3 mm, scattered, appressed, stellate. Fertile leaves 30–40 cm; petioles ca. 0.5 times the lamina length; laminae 20–32 × 3–4 cm, narrowly oblanceolate, entire, the apices acute, bases narrowly decurrent; intersporangial scales absent.

*Distribution and elevation.* *Elaphoglossum nidiforme* occurs in Bolivia, Ecuador, and Peru, at elevations of 700–2000 m.

*Discussion.* *Elaphoglossum nidiforme* is highly atypical morphologically within *Elaphoglossum* sect. *Squamipedia* and is included here on the basis of chloroplast DNA sequence data (Rouhan et al. 2007; Vasco et al., in prep.). It is atypical in its nest-forming habit, compact rhizomes, absence of peglike aerophores, presence of phyllopodia, extremely short petioles, sterile leaves 30–37 cm long, and oblanceolate laminae. By these characters it more closely resembles a member of *Elaphoglossum* sect. *Elaphoglossum*; however, the thin, light orange to brown scales on the petiole bases and proximal portions of the rachises suggest *Elaphoglossum* sect. *Squamipedia*, as do the echinulate spores (Moran et al., 2007). Curiously, a Madagascan species, *E. nidusoides*, resembles *E. nidiforme* (its specific epithet refers to the resemblance). As indicated by molecular sequence data, *E. nidusoides* belongs to *Elaphoglossum* sect. *Squamipedia* and is sister in analyses to another Madagscan endemic, *E. marojejyense* (Rouhan et al., 2007). The latter species morphologically resembles the typical Neotropical members of *Elaphoglossum* sect. *Squamipedia*, except for its perispore morphology, which is non-echinulate (Moran et al., 2007). Thus, it appears that there have been two independent origins in the evolution of large, non-creeping and nest-forming species within *Elaphoglossum* sect. *Squamipedia* in the Andes and Madagascar. Besides the two Madagascan taxa mentioned above, there are no other taxa of *Elaphoglossum* sect. *Squamipedia* outside of the Neotropics.

*Additional specimens examined.* BOLIVIA. **Cochabamba:** Prov. José Carrasco Torrico, 141 km antigua carretera Cochabamba-Villa Tunari, *Kessler et al. 7689* (NY), *Kessler et al. 7948* (NY, UC). **La Paz:** Prov. Caranavi, serranía de Bella Vista, pasando la cumbre en dirección a Caranavi, *Jiménez 2191* (NY); Prov. Caranavi, Comunidad Cultural Unidos, 36 km de Caranavi hacia Sapecho, *Kessler et al. 11690* (NY). **Unknown:** *Jiménez 2274* (LPB, NY, UC).

ECUADOR. **Zamora-Chinchipe:** Reserva San Francisco, ca. 30 km from Loja on new rd. Loja–Zamora, *Lehnert & Kessler 1316* (NY, UC); area of Est. Cienfífica San Francisco, ca. 30 km on rd. Loja–Zamora E of Ceja andina, *Werner 466* (NY).

**13. Elaphoglossum peltatum** (Sw.) Urb., Symb. Antill. 4: 61. 1903. Basionym: *Osmunda peltata* Sw., Prodr. 127. 1788. *Acrostichum peltatum* (Sw.) Sw., J. Bot. (Schrad.) 1800 (2): 11. 1801. *Rhipidopteris peltata* (Sw.) Schott ex Fée, Mém. Foug. [Hist. Acrost.] 2: 14. 1845. *Peltapteris peltata* (Sw.) C. V. Morton, Amer. Fern J. 45: 13. 1955. TYPE: Jamaica. s.d., *O. Swartz s.n.* (holotype, S!; isotypes, B!, B photo COL!).

Rhizomes ca. 1 mm wide, long-creeping; rhizome scales 1–2.5 mm, spreading to appressed, lanceolate, entire or nearly so, light orange to brown, dull. Sterile leaves 1.8–15 cm; petioles 0.5 to 0.8 times the lamina length; petiolar scales 1–2 mm, ovate to narrowly lancolate, concolorous; laminae 0.8–6 × 0.9–6 cm, ca. as long as wide, simple to 7 times dichotomously divided, circular to flabellate or lunate, apices obtuse, bases cordate to flabellate, segments 0.5–1.5 mm wide, linear; adaxial lamina surface scales absent; abaxial lamina surface scales absent or, if present, the scales 0.3–1.5 mm, ovate, nearly entire. Fertile leaves 2.6–8 cm; petioles 3 to 8 times the lamina length; laminae 0.5–20 × 0.5–20 mm, circular, margins entire or slightly crenate, apices rounded, bases cordate; intersporangial scales absent.

*Distribution and elevation.* *Elaphoglossum peltatum* is distributed in Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Peru, Puerto Rico, and Venezuela. It is epiphytic on mossy trunks and fallen logs and occurs in wet montane forests typically at middle and upper elevations. *Elaphoglossum peltatum* has been collected from across its range from (0 to)500 to 3000 m.

*Discussion.* Several forms of *Elaphoglossum peltatum* have been recognized, based on dissection of the sterile laminae (Fig. 13). These range from undivided leaf laminae (forma *standleyi*), to once or twice divided (forma *flabellatum* (Humb. & Bonpl. ex Willd.) Mickel), to three to seven times divided (forma *peltatum*). The forms appear quite distinct from each other and may even grow intermixed, maintaining their distinctness, as often occurs with forma *peltatum* and forma *standleyi* (Moran, pers. obs.). Examination of herbarium specimens, however, reveals many intermediates among all the forms. Unpublished molecular phylogenetic results (Vasco et al., in prep.) suggest that although all three forms are a clade, each form may have had multiple origins within the clade. For these two reasons, and the fact that historically "forms" have been used, we decided to recognize the differences at the taxonomic level as forms and not as varieties.

**13a. Elaphoglossum peltatum** (Sw.) Urb. f. **flabellatum** (Humb. & Bonpl. ex Willd.) Mickel, Brittonia 32: 116. 1980. Basionym: *Acrostichum flabellatum* Humb. & Bonpl. ex Willd., Sp. Pl. 5: 110. 1810. *Elaphoglossum flabellatum* (Humb. & Bonpl. ex Willd.) Christ, Neue Denkschr. Allg. Schweiz. Ges. Gesammten Naturwiss. [Monogr. *Elaph.*] 36: 58, fig. 21. 1899. *Peltapteris flabellata* (Humb. & Bonpl. ex Willd.) C. V. Morton, Amer. Fern J. 45: 13. 1955. *Peltapteris peltata* f. *flabellata* (Humb. & Bonpl. ex Willd.) L. D. Gómez, Brenesia 6: 28. 1975. *Rhipidopteris flabellata* (Humb. & Bonpl. ex Willd.) Fée, Mém. Foug. [Hist. Acrost.] 2: 78. 1845. TYPE: [Probably Venezuela or Colombia.] "America meridionali," *A. von Humboldt & A. Bonpland s.n.* (holotype, B-W-19530!). Figures 8G, H, 9C, 13D–K.

*Acrostichum flabellatum* var. *sphenophyllum* Kunze, Linnaea 9: 32. 1834. *Acrostichum sphenophyllum* (Kunze) Kunze, Analecta Pteridogr. 11, tab. 7. 1837. *Rhipidopteris sphenophylla* (Kunze) Fée, Mém. Foug. 2: 79. 1845. TYPE: Peru. Loreto: ad arbores sylvar. fl. Peruv. prope Pampayaco, 1829, *E. Poeppig s.n.* (lectotype, designated here, PR!; isolectotypes, B not seen, PR fragm. NY!).

*Acrostichum flabellatum* var. *bipartitum* Sodiro, Crypt. Vasc. Quit. 489. 1893. TYPE: Ecuador. Pichincha: crece en la región tropical, la variedad "beta" en la región cerca de la confluencia del río Napo con el Pilatón, s.d., *A. Sodiro s.n.* (holotype, P not seen).

*Acrostichum peltatum* var. *potentillifolium* Christ, Bull. Soc. Bot. Belgique 35(1): 242. 1896. *Peltapteris peltata* f. *potentillifolia* (Christ) C. F. Reed, Amer. Fern J. 51: 98. 1961. *Elaphoglossum peltatum* f. *potentillifolium* (Christ) Mickel, Brittonia 32: 116. 1980. TYPE: Costa Rica. San José: La Palma, [10°03′N, 83°59′W], 18 Dec. 1988, *H. Pittier 704* (holotype, P!; isotype, CR!).

Rhizomes 1–2 mm wide, long-creeping; rhizome scales 1–2.5 mm, spreading to appressed, lanceolate, entire or nearly so, light orange to brown, dull. Sterile leaves 1.8–6 cm; petioles 1 to 3 times the lamina length; petiolar scales 1–2 mm, clasping to slightly spreading, ovate to narrowly lancolate, with marginal teeth or processes toward the base, brown, dark at point of attachment; laminae 0.8–1.5 × 1–3.6 cm, 1 to 1.5 times as long as wide, chartaceous, dichotomously divided 1 to 2 times, flabellate, minutely crenulate on distal margins, apices broadly obtuse, rarely notched, bases cuneate, segments (1–)4–9 mm wide, cuneate, crenulate distally with entire sides; adaxial lamina surface scaly, the scales either ca. 0.3 mm and circular or 0.5–1 mm, ovate, with marginal processes, sometimes hastate, light brown to dark brown; abaxial lamina surface with scales like those adaxially. Fertile leaves 2.6–8 cm; petioles 3 to 8 times times the lamina length; laminae 0.5–1.2 × 0.6–1.1 cm, circular, margins entire or slightly crenate, apices rounded, bases cordate; intersporangial scales inconspicuous to conspicuous, 1–1.5 mm, brown, lanceolate, with marginal processes.

*Distribution and elevation.* *Elaphoglossum peltatum* f. *flabellatum* occurs in Bolivia, Colombia, Costa Rica, Ecuador, Guyana, Panama, Peru, and Venezuela. The form occurs in wet forests, at elevations of 400–2400 m.

*Discussion.* *Elaphoglossum peltatum* f. *flabellatum* is distinguished by sterile laminae isodichotomously divided one or two times. The blade segments are often 4–9 mm wide, cuneate, and crenulate distally, with entire margins. The holotype of *Acrostichum flabellatum* var. *sphenophyllum* Kunze at LZ was destroyed during World War II, thus the designation above of a lectotype at PR.

*Additional specimens examined.* BOLIVIA. **La Paz:** Prov. Nor Yungas, Est. Biol. Tunquini, *Eberhardt et al. 598* (NY, UC).

COLOMBIA. **Antioquia:** W from Panamer. Hwy. 5 km down rd. to San Fermín de Briceño, ca. 25 km N of Yarumal, *Luteyn et al. 10765* (COL, NY, UC); Mpio. de Briceño, correg. de San Fermín, finca de los Montoya, 2 km de la vía que de Ventanas conduce a Briceño, *Vasco et al. 452* (HUA, NY). **Caldas:** Río Sta. Rita, Salento, *Killip & Hazen 9012* (GH, NY). **Cauca:** W flank of cordillera Occidental, W of Tambo, *Haught 5234* (COL, NY); Popayán, *Lehmann 1041* (GH, NY); Panamer. Hwy. betw. Calibío & Piendamó, *Plowman & Vaughan 5378* (COL, GH). **Chocó:** Mpio. San José del Palmar, vereda La Holanda, *Franco et al. 1259* (COL, MO). **Cundinamarca:** San Antonio Valley, 15 km SE of Gutiérrez, 60 km S of Bogotá, *Grant 9815* (COL, NY). **Magdalena:** Sierra Nevada de Sta. Marta, quebrada Indiana, *Kirkbride Jr. 1925* (COL, NY, UC); Sierra Nevada de Sta. Marta, finca Reflejo, quebrada La Sirena, *Kirkbride Jr. 2127* (COL, NY, UC). **Nariño:** Mpio. Tumaco, Km. 90, a 20 km de La Guayacana, *Mora 4257* (COL); Mpio. Ricaurte, *von Sneidern 624* (GH, MO). **Risaralda:** Mpio. Mistrató, arriba del río Currumay vía Puerto de Oro, *Orozco et al. 2165* (COL). **Santander:** Mpio. Charala, Correg. Virolín, Cañaverales near finca Sta. Helena, *Sipman & Aguirre 27574* (COL). **Valle del Cauca:** Mpio. de Argelia, vereda La Bella, finca La Miranda, *Franco et al. 1869* (COL); La Cumbre, cordillera occidental, *Killip 11619* (GH, NY).

COSTA RICA. **Alajuela:** 8 km N of San Ramón & 4 km W on side rd., *Mickel 3623* (NY); Cantón de San Ramón, Reserva Forestal San Ramón, cordillera de Tilarán, sendero el Polígono, *Rojas 2618* (MO, NY). **Cartago:** Sta. Clara de Cartago, *Maxon & Harvey 8251* (GH, NY, UC); Cantón de Paraíso, Par. Nac. Tapantí, cuenca del Reventazón, sendero Árboles Caídos y Oro Péndula, *Rojas et al. 4851* (MO, NY); ca. 12 km S of Cartago, *Tryon & Tryon 7060* (GH). **Guanacaste:** Cantón de Abangares, Upper San Gerardo Valley, 5 km N Monteverde, Atlantic slope/continental divide, *Haber & Zuchowski 9563* (MO); Par. Nac. Guanacaste Est. Pitilla, fila Orosilito, *Hammel et al. 17461* (MO). **Heredia:** Braulio Carillo Nat. Park, *Hennippam et al. 6878* (MO). **Limón:** Cantón de Limón, R. I. Chirripó, fila de Matama, a orillas de una de las quebradas del Río Bolley, *Rojas et al. 2323* (MO); Cantón de Limón, R. I. Chirripó, fila de Matama, río Bolley, filas paralelas a los ramales del río, *Rojas et al. 2380* (MO). **Puntarenas:** Cantón de Puntarenas, Reserva Biol. Monteverde, 2 km NE Sta. Elena, *Haber 8536* (MO); Monte Verde, ca. 40 km N of Interamer. Hwy., *Mickel 3604* (NY). **San José:** Cantón de Perez Zeledón, cordillera de Talamanca, Las Nubes de Sta. Elena, sendero El Gringo, *Alfaro 523* (NY); Cantón de Moravia, La Hondura (bajo la Hondura) rd. to Río Claro, *Wagner & Wagner 77055* (MO, NY, UC).

ECUADOR. **Carchi:** Río Blanco drainage above Chical, tributary of Río San Juan, ca. 12 km W of Maldonado, *Gentry & Shupp 26546* (MO, QCA); trail from Rafael Quindí's finca back toward Untal to stream, ca. 0.5 km from finca, *Hoover & Wormley 1611* (MO). **Imbabura:** Ibarra, Lita, comunidad San Francisco, next to Río Verde, 13 air km S of Lita, *Clark et al. 7513* (NY); vic. of Río Verde, ca. 5 km SW from village of Maní, Río Cachaco, *Sperling & Bleiweiss 5018* (GH, QCNE). **Napo:** Archidona, carr.

Hollin–Loreto, Km. 25, sector Challua Yacu, *Cerón & Hurtado 6465* (MO, QCNE, UC); rd. Baeza–Tena, 6.8 km from Baeza, *Øllgaard 99984* (AAU, QCA, QCNE). **Pichincha:** rd. Pacto–La Delicia–La Esperanza, Km. 19.5, *Øllgaard et al. 2241* (AAU, QCA); Km. 36 along rd. to SE from La Aurora (Km. 7 on Sto. Domingo–Quevedo rd.), passing through La Reforma, *Øllgaard 98068* (AAU). **Zamora-Chinchipe:** S & SE of Zamora, *Øllgaard et al. 74861* (AAU, QCA); area of Est. Cientifica San Francisco, rd. Loja–Zamora, ca. 35 km from Loja, *Werner 688* (MO, NY, QCNE).

GUYANA. Upper Mazaruni river region, Karowtipu Mt., *Boom & Gopaul 7460* (NY); Upper Potaro river region, upper slopes of Mt. Wokomung, *Boom & Samuels 9195* (NY).

PANAMA. **Bocas del Toro:** Cerro Colorado, ca. 12 mi. from Camp Chami [Chame], *McPherson 9529* (MO). **Chiriquí:** Fortuna Dam area, along Quebrada Bonito to E of rd., *Churchill et al. 4839* (MO). **Panamá:** Par. Nac. Altos de Campana, sendero de interpretación, *Correa et al. 8586* (NY); area surrounding Rancho Chorrots above Torti Arriba, Canazas Mtn. chain, *Folsom et al. 6677* (AAU, NY).

PERU. **Amazonas:** *Woytkowski 8297* (GH, MO). **Ayacucho:** Aina, betw. Huanta & Río Apurimac, *Killip & Smith 22781* (NY); Carrapa, betw. Huanta & Río Apurimac, *Killip & Smith 23206* (GH, NY). **Cajamarca:** San Ignacio, Distr. Huarango, Poblado Selva Andina, trocha de captación de agua, *Perea & Mateo 2951* (AMAZ, HUT, MO, MOL, NY, USM). **Cusco:** Paucartambo, *Vargas-Calderón 6786* (MO). **Junín:** near La Merced, Villa Amoretti, *Kunkel 632* (GH); Satipo, rd. from Satipo to Comamanta, Ponte Pomay, *Weigend et al. 5755* (MO, NY). **Madre de Dios:** Manú, Cerro de Pantiacolla, Río Palotoa, 10–15 km NNW of Shintuya, *Foster et al. 10894* (AAU, GH, NY, UC). **Pasco:** Oxapampa, Abra los Melliza, 4–8 km from Eneñas, *Skog et al. 5039* (NY); Oxapampa, Gran Pajonal, near Chequitavo, *Smith 5310* (AAU, MO, NY). **San Martín:** Rioja, Venceremos, Km. 391 Bagua-Moyobamba rd., *Smith et al. 5960* (MO); near Tarapoto, *Spruce 4635* (NY).

VENEZUELA. **Amazonas:** Mpio. Atures, 8 km NW of settlement of Yutaje, plateau 3 km W of Río Coro-Coro, W of Serranía de Yutaje, valley E base of unnamed 1760 m peak, *Liesner & Holst 21548* (MO, NY, UC). **Barinas:** Distr. Bolívar, entre Santo Domingo y Altamira, Quebradón, en el camino que lleva al tunel que va hacia la represa, *Ortega & van der Werff 2356* (MO, NY, UC). **Mérida:** Río Albariga, N of Mérida, *Alston 6982* (MO), *Moritz 313* (NY). **Portuguesa:** Selva nublada, 15 km al E de Chabasquón, 67 km al NNO de Guanare, *Steyermark et al. 126785* (MO, UC). **Zulia:** Perijá, Sierra de Perijá, loma arriba de la quebrada del río Omira-kumá (Tumuriasa), cerca de la frontera Colombo-Venezolana SW de Pishikakao e Iría hacia la Misión de Sucurpo, *Steyermark & Dunsterville 105673* (NY).

### 13b. Elaphoglossum peltatum (Sw.) Urb. f. peltatum. Figures 8A–E, J, 9A, 13L–S.

*Elaphoglossum peltatum* f. *foeniculaceum* (Hook. & Grev.) Mickel, Brittonia 32: 116. 1980. Basionym: *Acrostichum foeniculaceum* Hook. & Grev., Icon. Filic. tab. 119. 1829. *Elaphoglossum foeniculaceum* (Hook. & Grev.) C. Chr., Index Filic. 307. 1906 [1905]. *Peltapteris peltata* f. *foeniculacea* (Hook. & Grev.) C. V. Morton, Amer. Fern J. 45: 13. 1955. *Peltapteris foeniculacea* (Hook. & Grev.) L. D. Gómez, Brenesia 6: 28. 1975. TYPE: Ecuador. Esmeraldas: Esmeralda, s.d., 3000 m, *W. Jameson s.n.* (holotype, K!).

Rhizomes 1–2 mm wide, long-creeping; rhizome scales 2–3.5 mm, spreading to appressed, lanceolate, entire or nearly so, light orange to brown, dull. Sterile leaves 3.5–10 cm; petioles 1.2 to 3 times the lamina length; petiolar scales 2–3 mm, clasping to slightly spreading, ovate to narrowly lancolate, with marginal teeth or processes toward the base, brown, concolorous; laminae 2–2.7 × 2.3–6 cm, 1 to 1.6 times as long as wide, chartaceous, dichotomously divided 3 to 7 times, flabellate, minutely crenulate on distal margins, apices broadly obtuse, rarely notched, bases cuneate, segments 1–2 mm wide; adaxial lamina surface scaly, the scales either ca. 0.3 mm and circular or 1–1.5 mm, ovate, with marginal processes, sometimes hastate, light brown to dark brown; abaxial lamina surface with scales like those adaxially. Fertile leaves 3–3.4 cm; petioles 3 to 8 times the lamina length; laminae 0.8–1.2 × 0.8–1.5 cm, circular, margins entire or slightly crenate, apices rounded, bases cordate; intersporangial scales inconspicuous to conspicuous, 0.5–1 mm, lanceolate, with marginal processes, brown.

*Distribution and elevation. Elaphoglossum peltatum* f. *peltatum* occurs in Belize, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Peru, Puerto Rico, and Venezuela. The form has been collected at elevations of (0)1000–3000 m.

*Discussion. Elaphoglossum peltatum* f. *peltatum* is characterized by sterile laminae that are generally dichotomously divided three to seven times, the segments linear and 0.5–2.2 mm wide. It is the most common and widespread form of *E. peltatum* and the only form of the species in the West Indies. *Elaphoglossum peltatum* f. *foeniculaceum* is based on specimens with narrower lamina segments (Figs. 8J, 13P–S). It is most common in Ecuador, but individuals with intermediate segment widths also occur in Ecuador, making it difficult to separate this form from typical form *peltatum*. For this reason, forma *foeniculaceum* is placed here in synonymy.

*Additional specimens examined.* BELIZE. **Cayo:** in forest along ridge, near ridge top camp in vic. of Doyle's Delight, S Maya Mtns., *Allen 15275* (MO, NY, UC). **Toledo:** S Maya Mtns., Bladen Nature Reserve, large sinkhole just S of upper Bladen Branch & 1.3 airline km SE of "AC Camp," *Davidse et al. 35900* (BRH, MO); Maya Mtns., Bladen Nature Reserve, Upper Bladen, Branch basin, along main Bladen canyon, *Holst et al. 5517* (BRH, MO, UC).

BRAZIL. **Amazonas:** N massif plateau of Serra Araca, *Prance et al. 29196* (NY); betw. Missâo Salesiana & Serra Pirapucú, *Silva & Brazâo 60851* (NY, UC). **Bahia:**

Camacan, Res. Serra Bonita, 9.7 km W de Camacan, *Matos 1330* (NY); Camacan, Faz. Serra Bonita, Reserva Serra Bonita, 9.7 km W de Camacan na estrada para Jacarecí, dai 6 km SW na estrada para RPPN Serra Bonita e Torre da Embratel, *Matos & Santos 1584* (NY). **Minas Gerais:** Mpio. Conceição, Serra do Cipó, Km. 152 estrada de Conceição, *Barreto 8851* (GH, RB). **Rio de Janeiro:** Itatiaia, Taquaral, *Campos-Porto 2645* (RB).

COLOMBIA. **Antioquia:** Mpio. Dabeiba, 32 km SE de Mutatá en la vía Mutatá–Dabeiba, río Chever, sitio Chever, *Callejas et al. 5076* (COL, MO, NY); Río Chiado, 65 km S of Turbo, *Haught 4638* (COL, NY); Mpio. Briceño, Correg. San Fermín, finca de los Montoya, 2 km de la vía que de Ventanas conduce a Briceño, *Vasco et al. 459* (HUA, NY). **Bolívar:** Boca Antizales, on Río Esmeralda, *Pennell 4486* (NY), *4507* (NY). **Boyacá:** Mpio. de Sta. María, vía Sta. María-Mambita, trayecto desde el río Garagoa a Sta. María, *Fernándes-Alonso et al. 24771* (COL); Mpio. Sta. María, vereda Calichana, sendero Ecol. Hyka-Quye, *González et al. 579* (COL, NY). **Caquetá:** Mpio. San Vicente de Caguán, transecto Neiva–San Vicente del Caguán, cerca de Los Andes, arriba del río Pato, *Churchill et al. 16890* (NY). **Cauca:** Mpio. de el Tambo, Reserva Nat. Tambito, *Casañas 252* (COL); Mpio. Guapi, Par. Nac. Isla Gorgona, camino hacia el mirador, *Fernández & Fuertes 278* (COL, NY). **Cesar:** Sierra Perijá, *Haught 4494* (COL, NY). **Chocó:** Carr. Yuto–Lloró, 1 km de Yuto, *Forero & Jaramillo 2709* (COL, MO, NY); rd. to Llora from Yuto, along creek ca. 2 km E of Yuto, *Gentry & Renteria 24416* (COL, MO); Nuquí, Alto de Buey, *von Sneidern A.38* (AAU, GH); Cabo Corrientes, Río Parguera, at foot of Janano Mt., *Warner 298* (COL, MO, NY). **Cundinamarca:** San Antonio Valley, 15 km SE of Gutiérrez, 60 km S of Bogotá, *Grant 9809* (COL); Monte Redondo, *Idrobo 1490* (COL, MO). **Magdalena:** Sierra de Onaca, *Smith 1042* (GH, MO, NY, UC). **Meta:** cordillera La Macarena (extremo NE) macizo Renjifo, *Idrobo & Schultes 1102* (COL, GH); Sierra de la Macarena, central mtns., N ridge, *Philipson & Idrobo 1845* (COL). **Nariño:** Mpio. Mallama, *Ramírez & González 9042* (UC). **Norte de Santander:** región del Sarare, quebrada de La China (afluente del río Cubugón), entre Sta. Librada y El Caraño, *Cuatrecasas 12998* (COL, UC); vic. of Toledo, *Killip & Smith 20095* (GH, NY). **Putumayo:** W of Mocoa, cuesta de Filo do Barniz, highest slope & top of ridge, *Barclay & Juajibioy 9451* (COL, GH, MO); 50 km al W del Pepino, *Hagemann & Leist 1543* (COL). **Risaralda:** Mpio. Mistrató, arriba del río Currumay vía Puerto de Oro, *Orozco et al. 2164* (COL). **Santander:** Mpio. Charalá, correg. Virolín, vereda El Reloj, *Díaz 1306* (COL); Mpio. Charalá, Virolín, *Ohba & Barbosa 75* (MO). **Valle del Cauca:** La Cumbre, cordillera Occidental, *Killip 11618* (GH, NY); Bajo Calima, Concesión Pulpapel/Buenaventura, carr. Canalete, *Monsalve 1798* (MO), *2108* (MO).

COSTA RICA. **Alajuela:** Cantón de Upala, Dos Ríos, 5 km S de Brasiliaargen derecha del río Pizote, *Herrera 1026* (MO); Reserva Biol. Alberto Brenes, N of San Ramón, *Moran 6446* (NY); Cantón de San Ramón, cuenca del San Carlos, ca. Reserva Forestal San Ramón, *Rojas et al. 3893* (MO, NY); Balsa de San Ramón, Stapp farm near school house, *Taylor 17779* (NY). **Cartago:** Cantón de Paraíso, Refugio Nac. Fauna Silvestre Tapantí, newly cut forest trail ca. 2 km beyond bridge adjacent to massive pipeline & ca. 10 km beyond puente Dos Amigos, *Almeda et al. 5807* (GH, MO); Turrialba Volcano, ca. 6 km above Trinidad, *Lent 702* (GH, NY). **Guanacaste:** Cantón de Abangares, La Cruz de Abangares, *Haber & Bello 2870* (MO); Cantón de Liberia, Par. Nac. Guanacaste, cordillera de Guanacaste, Est. Cacão, *Rojas 3031* (NY). **Heredia:** Cantón de Heredia, Vara Blanca de Sarapiquí, N slope of Central cordillera, *Skutch 3132* (GH, NY); 10 km NNE of Heredia, *Tryon & Tryon 7020* (GH, NY). **Limón:** Cantón de Talamanca, Sukut, de las juntas de río Urén y río Sukut 1.5 km aguas arriba sobre éste, margen derecha, *Herrera 3176* (MO); Cantón de Pococi, llanura de Tortuguero, San Juan de Pococi, Cuatro Esquinas, finca de hermanos Rojas Alvarado, *Rojas et al. 1826* (MO). **Puntarenas:** Monteverde, *Palmer 49* (NY); Cantón de Garabito, R. B. Carara, valle del Tarcoles, sector Bijagual, Montañas de Jamaica, *Rojas et al. 1952* (MO); Cantón de Golfito, Est. Río Bonito, Serranias de Golfito, sendero a la toma de agua, siguiendo por la quebrada, *Rojas & Fletes 3185* (MO, NY). **San José:** Cantón de Dota, R. F. Los Santos, cuenca del Savegre, camino a San Gerardo de Dota, orillas de camino, *Rojas 4961* (MO, NY); Cantón de Pérez Zeledón, above Albergue de Montana Savegre, Los Robles trail, near end of 4 × 4 rd., *Ruhfel 4* (CR, GH, INB, USJ).

CUBA. **Granma:** Sierra Maestra, on divide below Loma Joaquin & Punta de Palmamocha, *Ekman 5337* (MO). **Guantánamo:** Baracoa region, *León 12034* (NY); trail Navas to Camp Buena Vista, *Shafer 4461* (GH, NY). **Hologuín:** Sierra de Micaron, on path from Mayari arriba to camp at headwaters, *Ekman 6757* (NY); Camp La Gloria, S of Sierra Moa, *Shafer 8089* (GH, NY). **Santiago de Cuba:** Crest of Sierra Maestra betw. Pico Turquino & La Bayamesa, *Morton & Acuña 3765* (GH, MO, NY, UC); Sevilla estate, near Santiago, *Taylor 539* (NY); Gran Piedra, *Shafer 9021* (GH, NY).

DOMINICA. Betw. Laudat & freshwater lake, *Hodge & Hodge 1784* (GH); Morne Diablotin, *Hodge & Hodge 2803* (GH, NY), *Nicolson 1921* (MO); behind police post at Pont Cassé part way up Morne Trois Pitons, *Lellinger 547* (GH); Laudat, *Lloyd 348* (NY); Mt. Diablotin, *Lloyd 925* (NY).

DOMINICAN REPUBLIC. **Azua:** Santo Domingo, Sierra de Ocoa, San José de Ocoa, Bejucal, slope of Loma de los Palos, *Ekman 11835* (NY). **Barahona:** Montiada Nueva, SE of Polo, *Howard & Howard 8542* (GH, NY); Sierra de Baoruco, 4 km arriba el pueblecito rural de “Entrada de Cortico” en el camino a El Gajo, *Zanoni et al. 18869* (NY). **Distrito Nacional:** Santo Domingo, *Türckheim 2946* (NY). **Independencia:** Sierra de Neiba, along Carretera Internac. near crest of range, along Haitian border, vic. line betw. provinces of San Rafael & Independencia, *Gastony et al. 624* (GH, MO, NY); Sierra de Baoruco, 30 km S of Puerto Escondido en el camino a la Caseta No. 1 de Foresta y E en el camino a Charco Colorado, *Zanoni et al. 33996* (NY). **La Vega:** La Ciénaga, S bank of Río Los Guanos, just above confluence with Río de la Izquierda, *Gastony et al. 240* (MO, NY); 10.7 km W from autopista Duarte on rd. to arroyo Prieto & El Río, *Mejía & Zanoni 4980* (MO, NY). **Pedernales:** Sierra de Baoruco, 7.2–7.7 km S of ridge top, 4.8–5.3 km N of Los Arroyos on Jimaní–Pedernales rd., *Mickel et al. 8956* (MO, NY, UC); Sierra de Baoruco, Sapotén, 5 km S del puesto militar de El Aguacate en la Carretera Internac. a Los Arroyos y Pedernales, *Zanoni et al. 27128* (NY). **Peravia:** cordillera Central, Los Cateyes, falda NE de la Loma Valvacoa, NW de Baní, *Mejía & Pimentel 18355* (MO, NY); cordillera Central, 10 km de Rancho Arriba en la carretera a Piedra Blanca y 4 km en el camino a Mahoma y río Mahoma, “La Colonia” zona rural, *Zanoni et al. 22699* (GH, MO, NY). **Santiago:** Distr. San José de las Matas. Jicomé, arroyo La Guasimita, *Valeur 348* (MO, NY); cordillera Septentrional, sobre la cima de la

Loma Diego de Ocampo (NE de Santiago), *Zanoni et al. 42777* (NY). **Santiago Rodríguez:** cordillera Central, Par. Nac. J. C. Ramírez, entre Monte Llano y Los Descansaderos, *Zanoni & García 41983* (MO, NY).

EL SALVADOR. **Chalatenango:** Los Esemiles, *Yuncker 1125* (UC). **Morazán:** El Zancudo, *Seiler 993* (NY). **Santa Ana:** Par. Nac. Montecristo, cordillera de Metapán, betw. Los Planes & main rd. to mtn. summit, cloud forest just below summit of Montecristo, *Davidse et al. 37298* (BM, ITIC, LAGU, MO); Mpio. Metapán, bosque Montecristo, *Seiler 97* (MO).

ECUADOR. **Azuay:** Hwy. Cuenca-Cola de San Pablo, Contego encamp., *Boeke & Loyola 1015* (NY). **Cañar:** betw. Quillallpa & Kirpud, *Fagerlind & Wibom 713* (MO, S). **Carchi:** Lita, collections made in front of bulldozers constructing the Lita–San Lorenzo rd., 5 km from Lita, *Barfod et al. 41358* (AAU, MO, QCA, QCNE); above San Marcos de los Coaiqueres, on trail toward Gualpí Bajo, *Øllgaard et al. 57380* (AAU, MO, NY, QCA, QCNE). **Cotopaxi:** Quevedo–Latacunga rd., Km. 46 from Quevedo, NE slopes, *Holm-Nielsen et al. 2915* (AAU, MO, NY, QCA); Quevedo–Latacunga rd., *Holm-Nielsen et al. 2944* (AAU, NY, MO, QCA). **Esmeraldas:** Parroquía de Concepción, Playa Rica, *Mexia 8456* (B, GH, MO, S, UC). **Imbabura:** vic. Río Verde, ca. 5 km SW from village of Maní, Río Cachaco, *Sperling & Bleiweiss 5018A* (GH). **Morona-Santiago:** Los Tayos, *Argent & Burbidge 94* (QCA); E slope of cordillera, valley of Ríos Negro & Chupianza, on trail from Sevilla de Oro to Mendez, betw. Hac. Chontal & Sta. Elena, *Camp E-810* (NY). **Napo:** Cantón Mera, hac. La Mascota, *Mexia 7023A* (GH, UC); ca. 50 km NE of Baeza, Cascada de San Rafael, along Río Quijos, *Moran et al. 7565* (NY, QCA, QCNE, UC); rd. Baeza–Tena, 6.8 km from Baeza, *Øllgaard 99983* (AAU, QCA, QCNE). **Pastaza:** rd. N of Mera, toward Río Anzu, Km. 67, *Øllgaard & Navarrete 105643* (AAU, QCA). **Pichincha:** Hotel Tinalandia, 20 km E of Sto. Domingo de Los Colorados, *Balslev & Steere 3230* (AAU, NY, QCA); rd. Quito to Puerto Quito, Km. 113, forest reserve of ENDESA ca. 10 km N of main rd., *Balslev et al. 4688* (AAU, NY, QCA, QCNE, UC); Reserva Maquipucuna, sendero autoguiado, *Vasco et al. 855* (NY, QCA, QCNE). **Tungurahua:** Río Verde, *Lugo 1791* (AAU, GH, MO, NY). **Zamora-Chinchipe:** near Zamora, E slope of Andes, *Knight 686* (GH); Shaime, at jct. of Río Nangaritza & Río Numpatakai, *Øllgaard 98437* (AAU, QCA, QCNE); Cantón Nangaritza, Río Nangaritza, Pachicutza, *Palacios & Neill 6482* (MO, QCNE); area of Est. Cientifica San Francisco, rd. Loja–Zamora, ca. 35 km from Loja, *Werner 687* (MO, NY).

GUADELOUPE. bois du Haut Matouba, *Duss 4147* (NY).

GUATEMALA. **Alta Verapaz:** Mpio. Cobán, Chicu'sha'b [Chicuxab], 8 km al SW de Cobán, *Tenorio et al. 14728* (MO); Coban, *Türckheim 157* (GH, NY, UC); Cubilgüitz, *von Türckheim II.1022* (GH). **Baja Verapaz:** along hwy. CA-14 betw. El Progreso & Cobán, 3 mi. S of Purulhá, 17 mi. N of jct. with Hwy. 17 to Salamá & San Jerónimo, vic. km marker 160, *Croat & Hannon 63771* (MO, UC). **Chiquimula:** Volcán Ipala, near Amatillo, *Steyermark 30515* (GH). **Huehuetenango:** Mpio. Barillas, along rd. from Barillas to Malpais, *Christenhusz et al. 5400* (BM, MO). **Izabal:** vic. Exmibal Camp 2 (La Gloria), NW of lake Izabal, *Jones & Facey 3268* (NY); betw. Banera & "La Presa" in Montaña de Mico, *Steyermark 38277* (GH, NY). **Jalapa:** Volcán Jumay, N of Jalapa, *Steyermark 32470* (GH). **Quezaltenango:** Volcán Junil, *Skutch 957* (GH, NY). **Quiché:** Mpio. Uspantán, San Miguel Uspantán, *Heyde & Lux 3216* (GH, MO, NY). **San Marcos:** near Aldea Fraternidad, betw. San Rafael Pie de la Cuesta & Palo Gordo, W-facing slope of Sierra Madre Mtns., *Williams et al. 25734* (NY).

GUYANA. Upper Mazaruni river region, Karowtipu Mtn., *Boom & Gopaul 7497* (NY); Roraima, *Jenman s.n.* (NY); Mt. Roraima, Waruma trail, *Persaud 117* (NY); Mt. Roraima, upper slopes, Rondon Camp, *Tate 505* (NY).

HAITI. Massif du Nord, Port-de-Paix, Haut Piton, *Ekman 4618* (NY); vic. of St. Louis du Nord, mtns. S of town, *Leonard & Leonard 14555* (NY); Savane Zombis, *Pride 136* (GH).

HONDURAS. **Atlántida:** Ravines E of Texiquat river, 1–2 km SW of aldea La Aurora, *Hazlett et al. 8017* (MO). **Choluteca:** Rancho Quemado, Montaña de la Tigra, *Barkley 40047* (GH). **Comayagua:** Mpio. Siguatepeque, summit of San Juanillo, in cordillera de Montecillos Biol. Reserve, *Hawkins & Mejía 529* (MO); Mpio. Siguatepeque, near summit of range above El Achote [Achiote], in cloud zone above plains of Siguatepeque, *Yuncker et al. 6194* (GH, MO, NY). **Cortés:** Mpio. Sta. Cruz de Yojoa, E shore of lake Yojoa, *Williams & Molina 11434* (MO). **Francisco Morazán:** along rd. to Par. Nac. La Tigra, 22–25 km NE of Tegucigalpa, *Croat & Hannon 64055* (MO); Uyuca, *Valerio 759* (GH). **Intibucá:** E of La Esperanza, *Barkley 40355* (GH). **Lempira:** Celaque Nat. Park, trail from Camp 1 to Río Naranjal, *Moran 5556* (MO). **Ocotepeque:** Mpio. Belén Gualcho, cordillera de Celaque, 3 mi. N of Belén Gualcho along rd. to Cucuyagua, *Davidse et al. 35362* (MO). **Santa Bárbara:** 7 km N of El Mochito, on E slopes of Mt. Sta. Bárbara, *Moran 5695* (MO); Mpio. Ilama, Montaña de La Nieve, lado SO del Caserío El Tapiquilar, 20 km S de San Antonio de Cortés [Dept. Cortés on label], *Nelson et al. 8021* (MO). **Sololá:** Volcán Atitlán, *Steyermark 47414* (UC). **Yoro:** Río Pijol Valley, 6 to 7 km S of Nueva Esperanza, *Liesner 26619* (MO); Río Pijol Valley, 7 km SE of Nueva Esperanza, along forested quebrada that flows into Río Pijol & adjacent slopes, *Liesner 26629* (AAU, MO, NY, UC).

JAMAICA. **Portland:** valley of Trafalgar river, near Jumbe Spring, *Maxon & Killip 778* (GH, NY); near Vinegar hill, *Maxon & Killip 828* (GH, NY). **St. Andrew:** trail along leeward slope of Mt. Caledonia, NW of Hardware Gap, *Anderson 3300* (GH); near Hardware Gap, *Harris 10125* (NY), *Yuncker 18489* (NY). **St. Thomas:** Cuna Cuna Gap, *Britton 974* (NY).

MARTINIQUE. Bois des Deun-Choux, *Duss 1617* (NY); bois de la Fontaine, *Hahn 701* (GH); Morne Calebasse, N of Morne Rouge, *Proctor 21735* (GH).

MEXICO. **Chiapas:** Cascada, Siltepec, *Matuda 5122* (GH); Mpio. de Escuintla, Mt. Pasitar, *Matuda S-210* (GH, NY); near Tumbalá, *Nelson 3351* (GH, NY). **Guerrero:** Pilas-Pasión, Distr. Montes de Oca, *Hinton & Hinton 10756* (GH, MO, NY); Teotepec, *Hinton & Hinton 14273* (GH, MO, NY). **Hidalgo:** Mpio. Tlanchinol, 4 km E de Tlanchinol, camino a Apantlasol, *Martínez-Salas 28474* (NY); barranca below Honey Station, *Pringle 10304* (GH, MO, NY, UC). **Jalisco:** Sierra de Manantlán, 15–20 mi. SE of Autlán, on bajada S & W of divide betw. Aseradero San Miguel Uno & Durazno, *McVaugh 13925* (NY); steep mtns. 11–12 mi. S of Talpa de Allende, headwaters of a W branch of Río de Talpa, *McVaugh 21333* (MO, NY). **Oaxaca:** Mpio. de Coicoyán, Siki Nami, SW de Coicoyán, *de Avila 728* (MO, NY); Mpio. San Miguel Chimalapa, cerro Guayabitos, ca. 42 km en línea recta al N de San Pedro Tapanatepec, al NO de la Congregación Benito Juárez, filo alto al SE de la cima, *Wendt et al. 5185* (NY). **Puebla:** La Unión, 12 km NE de Tlatlauqui, carretera a Mazatepec, *Tenorio 14278* (NY); Mpio. de Teziutlán, Agua de Obispo, *Ventura-A 13637* (NY). **Veracruz:** Mpio. de Catemaco, Cumbres del Bastonal, NW de Tebanca, *Cedillo 3321* (GH, NY); Mpio. de Soteapan, base of Volcán Sta. Marta, 0–3 km E of village of Sta. Marta, *Nee et al. 24657* (NY); Mpio. de Atzalan, Cañada de Tatzayanalan, *Zamudio & Zamora 8466* (NY).

NICARAGUA. **Atlántico Norte:** Mpio. de Siuna, Reserva Bosawas, sendero rumbo a la cara oeste del cerro Saslaya, *Rueda et al. 4384* (HULE, MO); Mt. Livico, Madregava, *Seymour 3088* (F, GH, MO). **Atlántico Sur:** ca. 1 km N of El Zapote, 6 km S of Colonia Verdún, *Nee & Vega 27922* (MO); along new rd. from Río Blanco to Río Copalar, ca. 31 km E of Río Blanco, *Stevens 12166* (MO). **Estelí:** cerro Quiabú, 8 km al NW de Estelí, *Grijalva & Araquistain 595* (MO, NY, UC); ca. 23.5 km (by rd.) NE of Hwy. 1 at Estelí & ca. 2.8 km SE of Laguna Miraflores, *Henrich & Stevens 411* (MO, NY). **Granada:** Volcán Mombacho [Seymour series], *Atwood 3913* (MO, NY, UC); upper slopes of Volcán Mambacho, along W shore of lake Nicaragua, ca. 15 km S of Granada, *Croat 39143* (MO); Mombacho Volcano, *Maxon et al. 7794* (GH, US). **Jinotega:** Reserva Nat. Kilambé, Mpio. de Bocay, Comun. Sta. Teresa de Kilambé, *Rueda et al. 15532* (HULE, MO); mtns. betw. Matagalpa & Jinotega, cordillera Central de Nicaragua, *Williams et al. 23461* (MO, NY). **Matagalpa:** Falda NO del cerro Musún, al lado del río Bilampí, 4 km SO de Wanawás, *Araquistain & Moreno 2611* (MO, NY, UC); Sta. María de Ostuma, *Neill 863* (MO). **Nueva Segovia:** Mpio. de Jalapaontaña, cerro de Jesús, *Paguaga & Toval 19* (HULE, MO). **Río San Juan:** Mpio. el Castillo, Reserva Indio-Maíz, a lo largo del río Bartola entre el caño la Largarta y la cabecera del río Bartola, *Rueda et al. 5124* (HULE, MO); Mpio. el Castillo, Reserva Indio-Maíz, a lo largo del Caño Chontaleño, *Rueda et al. 5802* (HULE, MO); Mpio. el Castillo, Reserva Indio-Maiz, cerro el Diablo, *Rueda et al. 9701* (HULE, MO).

PANAMA. **Bocas del Toro:** Camp. Lucho, *Alfaro & Monro 5608* (MO); Fortuna Dam area, Cont. Divide, ridge trail to unnamed peak to E of Oleoducto rd., *Churchill 5865* (MO). **Chiriquí:** Distr. Boquete, Palo Alto, 4.5 mi. NE of Boquete, in forest along trail toward cerro La Trompeta, *Hammel 7477* (MO, PMA); Cerro de Lino, above El Boquete, *Maxon 5219* (GH, NY); Valley of upper Río Chiriquí Viejo, vic. Monte Lirio, *Seibert 173* (GH, MO, NY). **Coclé:** Bismark, above Penonomé, *Williams 504* (NY); betw. Las Margaritas & El Valle, *Woodson Jr. et al. 1252* (GH, MO, NY). **Colón**: Dto. Donoso, *Clark 12471* (UC). **Darién:** Cerro Pirre, *Duke 13847* (NY); Cana & vic., *Williams 899* (NY). **Panamá:** Altos del Castillo, cerro Azul, a 15 km de la carretera principal, *Casal 28a* (MO, PMA); 2–3 mi. S of Goofy Lake, rd. to Cerro Jefe, *Lewis et al. 293* (GH, MO, UC).

PERU. **Amazonas:** Condorcanqui, Río Cenepa region, near Shaim above quebrada Nahim, one-day walk from Huampami, *Berlin 445* (AAU, MO); Bagua, Dto. Imaza, Comun. Yamayakat, *Rojas et al. 548* (MO, NY, UC); Bagua, Montenegro–Chiriaco, *Sagastegui 5932* (GH). **Junín:** Prov. Satipo, Gran Pajonal, near Chequitavo, *Smith & Rutter 6671* (MO, NY); Satipo, Gran Pajonal, E of Chequitavo on trail to Kotampaz, *Smith 6772* (MO, UC). **Loreto:** Coronel Portillo, Km. 209 entre Tingo María y Pucallpa, Aguaytía, *Ridoutt s.n.* (GH); Coronel Portillo, Distr. Padre Abad, Boquerón de Padre Abad, *Schunke-Vigo 3047* (COL, GH, NY). **Pasco**: Dto. Palcazú, *Vasquez et al*. 29558 (UC). **San Martín:** Rioja, Venceremos, Km. 391 Bagua–Moyobamba rd., *Smith et al. 5959* (MO). **Ucayali:** Boquerón Pass, 92 km from Tingo María on hwy. to Pucallpa, *Allard 22122* (GH).

PUERTO RICO. cordillera Central, Toro Negro State Forest, along headwaters of Río Inabón above high falls, *Proctor 40076* (NY); Caribbean Natl. Forest, slopes of El Yunque, *Scamman 6545* (GH); near Mt. Jajuya, 2 Jan. 1978, *Tullis s.n.* (GH); Luquillo Mtns., *Wilson 76* (GH, NY).

VENEZUELA. **Amazonas:** Dpto. Río Negro, Camp XI, Cerro de la Nebilna, 6.2 km NNE Pico Phelps [Neblina], 20.5 km ENE Neblina Base Camp, along stream Caño Beitel, S of camp, *Beitel 85271* (MO, NY, UC); Mpio. Atabapo, Cerro Marahuaca, "Sima" area, *Liesner 25076* (MO, NY, UC). **Aragua:** along rd. betw. Maracay & Ocumare, Henri Pittier Nat. Park, at summit in cloud forest zone, *Croat 60591A* (MO); Par. Nac. Henry Pittier, trail above Guamitas to summit of La Mesa, above El Limón, *Steyermark 89823* (GH). **Barinas:** Distr. Bolívar, La Soledad, *Ortega 1203* (MO, NY); rd. from Santo Domingo to Barinitas, quebrada on rocks, *Wessels-Boer 1994* (MO). **Bolivar:** Mt. Roraima, SW-facing quebrada near Rondón Camp, *Steyermark 58694* (GH, NY); Ptari-tepuí, steep S-facing slopes, betw. "Cave Rock" & base of high sandstone bluffs, *Steyermark 59580* (GH, MO, NY). **Falcón:** Sierra San Luis, ca. Hotel Parador, *Wingfield & van der Werff 6560* (MO), *6586* (MO, UC). **Lara:** Jiménez, Par. Nac. Yacumbu, *Quijada 121* (NY); Palavecino, fila de Terepaima, betw. Alto de Chuparral & Loma Redonda, 21–23 km S of Cabudare, *Steyermark et al. 103394* (NY). **Mérida:** Canagá y Mucuchachí, Distr. Arzobispo Chacón, *Ruiz-Terán & Lopez-Figueiras 655* (NY); betw. Mucuchachí & Canaguá, *Steyermark 56334* (GH, MO). **Portuguesa:** Depto. Guanare, ESE of Paraísco de Chabasquén, along rd. to Cordoba, ca. 20–25 min. from Chabasquén, *Smith et al. 1004* (MO); selva nublada, 15 km. E de Chabasquén, 67 km. NNO de Guanare, *Steyermark et al. 126574* (MO, UC). **Sucre:** Península de Paria, Cerro de Humo, a lo largo de las cabeceras del río Sta. Isabel, acerca de camino de bestias entre "Los Positos" y La Roma, *Steyermark 96335* (GH). **Táchira:** Cerro Las Minas, bordering quebrada Las Minas, 18 km SE of Sta. Ana, *Steyermark & Liesner 118993* (MO, NY); Distr. Uribante, Empresa Las Cuevas near La Fundación, *van der Werff & González 5032* (MO). **Yaracuy:** Sierra de Aroa, cerro Negro, arriba de San Felipe, *Steyermark & Wessels-Boer 100452* (NY); Carretera entre Buenos Aires y Guamales, parte occidental de la Sierra de Aroa, Distr. Urachiche, N de Urachiche, *Steyermark et al. 114074* (NY).

**13c. Elaphoglossum peltatum** (Sw.) Urb. f. **standleyi** (Maxon) Mickel, Brittonia 32: 116. 1980. Basionym: *Rhipidopteris standleyi* Maxon, Amer. Fern J. 18: 1. 1928. *Peltapteris flabellata* f. *standleyi* (Maxon) C. V. Morton, Amer. Fern J. 45: 13. 1955. TYPE: Costa Rica. San José: near La Hondura, [10°04′N, 83°59′W], 1300–1700 m, 2–4 Mar. 1924, *P. C. Standley 36464* (holotype, US!). Figures 8F, 13A–C.

Rhizomes 1–2 mm wide, long-creeping; rhizome scales 1.5–4 mm, spreading to appressed, lanceolate, entire or nearly so, light orange to brown, dull. Sterile leaves 2–3.8 cm; petioles 1 to 1.3 times the lamina length; petiolar scales 1–2 mm, clasping to slightly spreading, ovate to narrowly lancolate, with marginal teeth or processes toward the base, brown, dark at the point of attachment; laminae 0.8–1.6 × 0.9–2.8 cm, ca. as long as wide, chartaceous, simple, circular to flabellate or lunate, minutely crenulate on distal margins, apices broadly obtuse, rarely notched, bases broadly cuneate; adaxial lamina surface scaly, the scales 0.5–1 mm, ovate to narrowly lanceolate, light brown; abaxial lamina surface with scales like those adaxially. Fertile leaves 3–3.4 cm; petioles 4 to 6 times the lamina length; laminae 0.5–0.7 × 0.5–1 cm, circular or slightly lobed, margins entire or slightly crenate, apices rounded, bases cordate; intersporangial scales ca. 1 mm, lanceolate, with marginal processes, brown.

*Distribution and elevation*. *Elaphoglossum peltatum* f. *standleyi* occurs in Colombia, Costa Rica, Ecuador, Panama, Peru, and Venezuela at elevations of 450–2200 m.

*Discussion*. *Elaphoglossum peltatum* f. *standleyi* is characterized by sterile laminae that are undivided and circular to flabellate or lunate, and fertile laminae that are circular or slightly lobed. Occasionally, apically notched laminae are found along the same rhizome as leaves with entire margins.

*Additional specimens examined*. COLOMBIA. **Antioquia:** Par. Nac. Nat. Las Orquídeas, sect. Venados, *Cogollo et al. 2917* (COL, MO). **Cundinamarca:** Fasagasugá, *Lindig 270* (GH). **Putumayo:** W of Mocoa, Cuesta de Filo de Barniz, highest slope & ridge top, *Barclay & Juajibioy 9453* (COL, GH).

COSTA RICA. **Alajuela:** Cantón de Upala, cuenca del Zapote, Bijagua, camino a la toma de agua, *Rojas & Soto 4278* (MO, NY); Cantón de San Ramón, N slope of ridge along quebrada draining E to Río Cataratitas, ca. 20 km NW of San Ramón, *Smith et al. 2220* (AAU, MO, NY, UC). **Cartago:** Casa de Tejas Ridge above Río Gato, *Lent 3699* (AAU, NY); Cantón de Turrialba, Res. Biol. Barbilla, cuenca del Matina, camino a valle Escondido, entrando por las Brisas de Pacuarito, entre la casa de Don Felipe Salazar y parte alta de la fila de regreso, *Rojas et al. 5053* (MO, NY). **Guanacaste:** ca. 5 km E of Tilarán, above laguna de Arenal, *Williams & Williams 24575* (MO, NY). **Puntarenas:** Cantón de Coto Brus, P. I. La Amistad, cordillera de Talamanca, Est. Pittier, frente al portón de la entrada del Parque (potrero), *Angulo 364* (MO); Monteverde, Quaker Colony, *Hauke 477* (NY). **San José:** Cantón de Moravia, along Río Hondura, where Río Zurquí flows into Río Hondura, below bajo La Hondura, *Taylor & Taylor 11943* (MO, NY).

ECUADOR. **Carchi:** San Marcos de los Coaiqueres, on trail Chical-Tobar Donoso, *Øllgaard et al. 57642* (AAU, NY). **Esmeraldas:** Rd. Lita-Urbina, Km. 38.8, *Øllgaard et al. 98682* (AAU, QCA, QCNE). **Morona-Santiago:** cordillera de Cutucú, W slopes, along trail from Logroño to Yaupi, *Madison et al. 3313* (GH); trail along Río Inimkis, ca. 3 km NE of village of Inimkis (San Luis) toward foothills of cordillera Cutucú, *Øllgaard & Navarrete 1433* (QCA). **Napo:** Shell-Mera, *Asplund 19710* (NY). **Pastaza:** E of Puyo, along rd. to Macas, around Mpio. Stadium, *Fay & Fay 3604* (MO, NY, QCNE); Shell-Mera forest, 2 km N of Shell-Mera, *Holm-Nielsen & Jeppesen 425* (AAU, S); Puerto Santana, 20 km along Río Pastaza, SSE of Shell-Mera, *Holm-Nielsen & Jeppesen 532* (AAU, GH, S). **Tungurahua:** Río Negro, just outside village, *Fagerlind & Wibom 1255* (MO, S); vía Baños–Puyo, sendero que conduce al río Cristal, *Pérez & Moscoso 2702* (QCA).

PANAMA. **Bocas det Toro:** betw. Fortuna Dam and Chiriquí Grande, *Croat & Grayum 60433* (UC). **Coclé:** Vic. El Valle, *Allen 1260* (GH, MO, NY); betw. Cerro Pilón & el valle de Antón, *Baker 13961* (NY); 3-mtn. ridge above El Valle, *Hamilton et al. 4122* (AAU, MO, UC). **Panamá:** sendero de interpretación, 1 km E del camp. de los guardabosques de INRENARE, *Correa et al. 8044* (PMA); Par. Nac. Altos de Campana, sendero de interpretación, *Correa et al. 8577* (NY). **Veraguas:** Distr. Sta. Fé, NW of Sta. Fé, 8.8 km from Escuela Agricola Alto de Piedra, Pacific slope, *Mori et al. 3984*, *3998* (MO, WIS).

PERU. **Cusco:** Paucartambo, Pillawata, Yanamago–Tambomayo, *Vargas-Calderón 16733* (GH).

VENEZUELA. **Aragua:** river Tuy below Colonia Tovar, *Fendler 263* (GH, MO, NY, YU).

**14. Elaphoglossum rhomboideum** A. Vasco, Mickel & R. C. Moran, sp. nov. TYPE: Ecuador. Carchi: valle de Maldonado, Km. 67 on rd. Tulcán–Maldonado, 0°53″N, 78°04″W, 2400 m, 20 Mar. 1973, *L. Holm-Nielsen, S. Jeppesen, B. Løjtnant & B. Øllgaard 6168* (holotype, AAU!; isotypes, MO!, UC!). Figures 5G–J, 11E–J, 12.

Rhizomes 1 mm wide; rhizome scales 3–4 mm, appressed, lanceolate, entire, light orange to brown, concolorous or with dark point of attachment, dull. Sterile leaves 2.4–4.7 cm; petioles 0.7 to 3.3 times the lamina length; petiolar scales 2–2.5 mm, scattered, lanceolate, entire, light orange to brown, concolorous; laminae (0.7–)0.9–1.6 × 0.9–1.9 cm, 0.8 to 1 times longer than wide, chartaceous, simple, rhombic to (less commonly) triangular, margins minutely crenulate, apices rounded to broadly acute, bases broadly cuneate or (in triangular laminae) truncate; adaxial surface with scales 1–2 mm, brown, ovate to lanceolate, often hastate at the base; abaxial lamina surface with scales 1–2 mm, brown, ovate to lanceolate, often hastate at the base. Fertile leaves 2.7–7.5 cm; petioles 2 to 3 times the lamina length; laminae 0.7–1 × 0.6 cm, broadly ovate, entire, apices rounded, bases broadly cuneate; intersporangial scales 1.5–2 mm, hastate with lateral processes, brown, shiny.

*Etymology*. *Elaphoglossum rhomboideum* is characterized by small rhombic leaves, thus the specific epithet from the Latin.

*Distribution and elevation*. *Elaphoglossum rhomboideum* is known only from the border areas between

Colombia and Ecuador, on the western side of the Andes, and has been collected at elevations from 2400 to 3200 m.

*IUCN Red List category*. Because *Elaphoglossum rhomboideum* is a new species, more information is needed to determine its appropriate IUCN listing. Therefore it should be included in the category Data Deficient (DD), according to IUCN Red List criteria (IUCN, 2001).

*Discussion*. *Elaphoglossum rhomboideum* is characterized by small rhombic laminae and resembles *E. andreanum* in its small size, crenulate lamina margins, and geography, but that species differs by more elongate triangular laminae. Another difference is the tendency for *E. rhomboideum* to have brown, concolorous laminar scales, whereas those of *E. andreanum* are typically black or at least dark at the point of attachment. Some *E. concinnum* specimens with rhombic leaves might resemble *E. rhomboideum*, but *E. concinnum* is known only from southern Ecuador and northern Peru (Fig. 1C), whereas *E. rhomboideum* is so far known only from the western side of the Andes in southern Colombia and northern Ecuador (Fig. 12).

*Paratypes*. COLOMBIA. **Cauca:** above Carpintero, E Slope of W cordillera, [2°47″N, 76°36″W], 2500 m, 23 Apr. 1939, *A. H. G. Alston 8235* (MO); Par. Nac. Nat. Munchique, [2°42″N, 77°05″W], 2800 m, *F. González 3116* (COL, NY); Cerro de Munchique, [2°32″N, 76°59″W], 2400 m, Mar. 1884, *F. C. Lehmann 3641* (K).

ECUADOR. **Carchi:** valle de Maldonado, Km. 67 on rd. Tulcán–Maldonado, 0°53″N, 78°04″W, 2400 m, 20 May 1973, *L. B. Holm-Nielsen, S. Jeppesen, B. Løjtnant & B. Øllgaard 6168* (AAU, MO, UC); rd. Tulcán–Maldonado, 53–54 km from Tulcán, [0°50″N, 78°03″W], 3100–3200 m, 31 July 1976, *B. Øllgaard & H. Balslev 8306* (AAU).

**15. Elaphoglossum squamipes** (Hook.) T. Moore, Index Fil. 15. 1857. Basionym: *Acrostichum squamipes* Hook., Icon. Pl. 2: tab. 197. 1837. TYPE: Peru. Amazonas: Chacapoyas, [6°13″S, 77°51″W], 1836, *Mathews s.n.* (holotype, K!; isotype, NY!). Figures 2N–Q, 3A–F, 6D, 10A–D.

*Acrostichum ovatum* Liebm., Kongel. Danske Vidensk. Selsk. Skr., Naturvidensk. Math. Afd., ser. 5. 1: 164. 1849, nom. illeg., non *Acrostichum ovatum* Hook. & Grev., 1831 nec *Acrostichum ovatum* Fée 1872. Replacement synonym: *Elaphoglossum subaequale* T. Moore, Index Fil. 368. 1862. TYPE: Mexico. Oaxaca: slopes of Cerro Zempoaltépetl, [17°25″N, 95°58″W], 2660–3000 m, June 1842, *F. Liebmann s.n.* [Pl. Mex. 2431, Fl. Mex 5] (holotype, C!; isotypes, B-20 0072019d!, K!, K fragm. US!).

*Elaphoglossum craspedariiforme* (Fée) Brade ex Alston, Bol. Soc. Brot. sér. 2, 32: 26. 1958, as "craspedariaeforme." Basionym: *Acrostichum craspedariiforme* Fée, Crypt. Vasc. Brésil. 1: 261. tab. 81, fig. 1. 1869. TYPE: Brazil. Rio de Janeiro: Serra dos Orgãos, [22°26″S, 42°59″W], 8 Aug. 1869, *A. F. M. Glaziou 3550* ["*3350*" sic, protologue] (holotype, P! [2], P photos MO!, NY!; isotypes, B!, K!).

Rhizomes 1–2 mm wide; rhizome scales 3–4.5 mm, appressed, ovate to linear or lanceolate, entire, light orange, dull. Sterile leaves 4.5–16.5 cm; petioles 0.75 to 2.2 times the lamina length; petiolar scales 2–3 mm, slightly spreading, ovate to narrowly lanceolate, entire or occasionally with marginal processes at the base, light orange to brown, concolorous; laminae 3–12.5 × 0.8–2 cm, 1.8 to 2.5(to 4) times longer than wide, coriaceous, simple, ovate-lanceolate or spatulate, entire to occasionally (especially in small leaves) minutely crenulate, apices obtuse, bases broadly cuneate; adaxial lamina surface scaly, the scales 0.5–2.5 mm, linear to hastate, often coarsely and irregularly toothed, especially toward the base, light brown to brown, often darkened at point of attachment and centrally; abaxial lamina surface with scales like those adaxially. Fertile leaves 3.2–12.5 cm; petioles 2.8 to 4.5 times the lamina length; laminae 0.7–2.5 × 0.5–1.1 cm, ovate to elliptic, entire, apices obtuse, bases slightly cordate to short-decurrent; intersporangial scales 1–2 mm, marginal processes occasionally present, light brown to dark brown.

*Distribution and elevation*. *Elaphoglossum squamipes* is distributed in Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Peru, and Venezuela. It has been collected at elevations of (800–)1700–3930 m.

*Discussion*. *Elaphoglossum squamipes* is characterized by petioles 0.7 to 2.2 times longer than laminae, laminae generally entire, ovate-lanceolate or spatulate with obtuse apices, and laminar scales light brown to brown. Although not constant, most specimens of *E. andreanum* differ from *E. squamipes* by the laminae with minutely crenulate margins and mostly dark brown scales. General leaf shape is very similar in some specimens of *E. squamipes* and *E. lloense*. *Elaphoglossum squamipes* differs by smaller leaves (3–12.5 cm vs. 6–25 cm in *E. lloense*), somewhat narrower laminae (0.8–2 cm vs. 1.1–2.8 cm), and obtuse lamina apices (vs. attenuate). *Elaphoglossum minutum* might be confused with *E. squamipes* because of their similar general leaf shape, but *E. minutum* differs by its presence at lower elevations (100–1000[–1700] m vs. [800–]1700–3930 m in *E. squamipes*) and more oblong, often parallel-sided laminae.

Our unpublished molecular phylogenetic studies based on chloroplast markers (*atpB-rbcL*, *rps4-trnS*, and *trnL-F*) resolved the Brazilian accesions of *Elaphoglossum squamipes* in a different clade distinct from the other accessions of *E. squamipes* from elsewhere. We cannot, however, find any morphological characters to distinguish these two clades, and therefore we will continue to recognize the Brazilian and non-Brazilian plants as the same species. If the disjunct populations in southeastern Brazil were to be recognized as taxonomically distinct, the name *E. craspedariiforme* would apply.

*Additional specimens examined.* BOLIVIA. **Cochabamba:** Prov. Carrasco, 100 km antigua carr. Cochabamba-Villa Tunari, *Kessler et al. 6742* (UC). **La Paz:** Prov. Franz Tamayo, bajando por el sendero al frente de Puina (pueblo antiguo), río abajo, *Jiménez et al. 2888* (LPB, MO, UC).

BRAZIL. **Minas Gerais:** Boacaina de Minas, Par. Nac. Itatiaia, Alto dos Brejos, *Condack 250* (RB), *Condack 318* (RB). **Rio de Janeiro:** Itatiaya, *Brade & Tamandaré 6447* (GH, NY, RB, UC); Bananal, *Brade 15206* (RB); Itatiaia, *Brade 15531* (F, GH, MO, NY, RB); Itatiaia, Par. Nac. Itatiaia, Maromba, trilha para o Véu da Noiva, *Sylvestre et al. 1878* (RB). **São Paulo:** Santo André, Alto da Serra, *Brade 5290* (AAU, GH, NY, RB, UC); Rio Grande, *Wacket 301* (K, NY, RB, UC).

COLOMBIA. **Boyacá:** arriba de la carr. Tunja Arcabuco, quebrada afluente del río Pómeca, *Jaramillo-M. et al. 3678* (COL, NY); Mpio. Villa de Leyva, SFF de Iguaque, bosques secund. de Robles, ca. al centro de visitantes, *Vasco et al. 759* (HUA, NY). **Magdalena:** Sierra Nevada de Sta. Marta, transecto del Alto Río Buriticá, *Jaramillo-M. et al. 5355* (COL). **Norte de Santander:** La Mesita, Pamplona, *Alston 7201* (COL, F, NY). **Quindío:** Mpio. de Génova, camino finca Servia, *Vélez et al. 1820* (COL). **Santander:** W slope of Páramo Rico, *Killip & Smith 17748* (GH). **Tolima:** Mpio. de Sta. Isabel, cordillera Central, vertiente oriental, valle del río Totarito, *Jaramillo-M. et al. 6381* (COL).

COSTA RICA. **Cartago:** Cantón de El Guarco, Reserva For. Río Macho, cuenca del Reventazón, Estación Ojo de Agua, sendero La Quebrada, *Gamboa 995* (INB, MO); below crater of Turrialba Volcano, *Lent 717* (GH, NY). **Heredia:** Cantón de Barva, P. N. Braulio Carrillo, cordillera Central, Estación Barva, *Fernández & García 1433* (MO); slopes & ridges above Laguna del Barva & summit of Volcán Barva, *Grayum & Quesada 7431* (MO). **Puntarenas:** Cantón de Coto Brus, Cerro Echandi, Costa Rica–Panama border, Puntarenas–Bocas Prov. border, *Gómez et al. 21843* (AAU, MO); Cantón de Buenos Aires, P. N. La Amistad, Tararia, Limón/Puntarenas, Par. Internac. La Amistad, sendero a cerro Kámuk, entre cerro Kas, *Rojas 3197* (MO, NY). **San José:** Cantón de Pérez Zeledón, Albergue Cuericí, El Sitio, *Moran 6308* (MO, NY); Cantón de Pérez Zeledón, P. N. Chirripó, cordillera de Talamanca, *Rojas 2853* (MO); Cantón de Pérez Zeledón, rd. from Cartago to San Isidro del General (Pan Amer. Hwy., Rt. 2), Km. 96–97, ca. 1.5 km S of Villa Mills, near Siberia, *Smith & Béliz 2050* (MO).

ECUADOR. **Cañar:** N rim of the Río Cañar valley, betw. Suscal & Chontamarca, *Camp E-2882* (F, NY). **Chimborazo:** rd. 10 km NE of Alao, at Cuspipaccha, *Øllgaard et al. 38189* (AAU). **Cotopaxi:** Cantón Sigchos, en la cima del cerro Azul, ca. 1:20 horas de casa del Sr. Marco Sillio, *Ramos et al. 6629* (COL, CUVC, MO, QCNE), *Ramos et al. 6669* (CUVC, NY, QCNE, UC). **Imbabura:** Lago San Marcos, Cayambe, *Cazalet & Pennington 5479* (NY, UC). **Loja:** Par. Nac. Podocarpus, Cajanuma, matrix plot M1, *Lehnert 2259* (QCA). **Napo:** Near Papallacta, Aug. 1918, *Mille s.n.* (GH, NY); Oyacachi, 5 km después del paso, *Navarrete 1356*, *1380* (NY, QCA). **Pichincha:** Cerro Pasochoa, *Eriksen 59211* (QCA, QCNE); W of pass betw. Iliniza & Carazón, rd. & trail from Chaupi, *Øllgaard et al. 1185* (AAU, QCA, QCNE). **Tungurahua:** Cantón Santiago de Píllaro, Par. Nac. Llanganates, carr. Píllaro-Represa Pisayambo-líaguna Cochas Negras, camino río Milín-Aucacocha, *Freire et al. 3011* (MO, QCNE); S slope of volcano Tunguragua, *Rimbach 7* (GH, NY).

EL SALVADOR. **Chalatenango:** bosque de El Pital, *Montalvo 4812* (MO); summit of Cerro El Pital, *Seiler 149* (F); Cerro El Pital, *Seiler 745* (GH, NY).

GUATEMALA. **Chimaltenango:** Tecpán, 23 Dec. 1936, *Faull s.n.* (GH); Cerro de Tecpám, region of Sta. Helena, *Standley 60956* (F). **Huehuetenango:** Sierra Cuchumatanes, rd. to San Juan Ixcoy, *Molina 21313* (F).

HONDURAS. **Lempira:** Camino entre la montaña El Mojon y San Manuel de Colohete, Par. Nac. Celaque, *House 1129* (MO); Celaque Nat. Park, betw. Camp 1 & first summit, ca. 8 km WSW of town of Gracias, *Moran 5643* (MO).

MEXICO. **Chiapas:** Motozintla, N & W slope of Cerro Mozotal below microwave tower along rd. from Huixtla to El Porvenir & Siltepec, *Breedlove & Smith 22733* (F, MO, NY); El Porvenir, along rd. betw. Motozintla de Mendoza & Siltepec, 21.5 mi. NW of Motozintla, 1.3 mi. E of El Porvenir, *Croat 47349* (MO). **Guerrero:** 2 km NE of Camp. El Gallo, SW slopes of Cerro Teotepec, *Rzedowski & McVaugh 118* (NY) **Oaxaca:** Mixes, W slope of Cerro Zempoaltepetl to Yacoche, *Mickel 4587* (NY); Mixes, NW slope of Cerro Zempoaltepetl, trail from Yacohe to Totontepec, *Mickel 4649* (NY); Cerro de Malacate, N of Capulalpan, ca. 8 km E of Ixtlán, Ixtlán, *Mickel 5266* (NY). **Veracruz:** Coatepec, Cofre de Perote, entre Mesa de Los Laureles y Tierra Grande, bosque de Niebla, *Cházaro & Castillo 6791* (MO); Orizaba, *Müller 39* (NY).

PANAMA. **Bocas del Toro:** cordillera de Talamanca, 8 airline km NW of peak of Cerro Echandi on Costa Rica–Panama internat. border, *Davidse et al. 25269* (MO); Cerro Fábrega, ca. 1.5 km NW of peak, *Monro et al. 4165* (MO). **Chiriquí:** above El Potrero Camp, Volcán Chiriquí, *Maxon 5327* (GH, NY); vic. of Casita Alta, Volcán de Chiriqui, *Woodson Jr. et al. 958* (GH, MO, NY).

PERU. **Amazonas:** Chachapoyas, Cerros Calla Calla, E side, 10 km above Leimebamba on rd. to Balsas, *Hutchison & Bennett 4753* (F, GH, NY, UC); Chachapoyas, Cerros Calla Calla, W side, 45 km above Balsasid-way on rd. to Leimebamba, *Hutchison & Wright 5825* (F, MO, NY, UC); Chachapoyas, around Molinapampa, *van der Werff et al. 16901* (MO, UC); Chachapoyas, upper slopes of Puma-urcu ESE of Chachapoyas, *Wurdack 692* (F, K, NY, UC). **Cajamarca:** Sallique, Lanchal, La Cocha, *Díaz et al. 9669* (MO, UC). **Cusco:** La Convención, Distr. Vilcabamba, Paltaybamba, Ayangate, *Valenzuela et al. 9124* (CUZ, MO). **Junín:** Muña, *Bryan 526* (F); Mito, *Macbride 3359* (F); Muña, *Macbride 4024* (F). **Pasco:** Oxapampa, Distr. Huancabamba, sect. Sta. Barbara, *Mellado & Ortiz 2680* (NY, UC, USM); Oxapampa, Sta. Barbara, *Smith 8164* (MO, NY). **San Martín:** Prov. Mariscal Cáceres, Río Abiseo Nat. Park, Puerta del Monte, *Young 1997* (NY).

VENEZUELA. **Lara:** Parque Nacional Diníra, *Riina et al. 970* (UC). **Mérida:** trail from La Negrita to Boquerón, quebrada de las Cañas, *Luteyn et al. 6117* (AAU, NY, UC); Carr. Bailadores a La Grita via El Portachuelo, 3 km del cruce a las porqueras, *Vasco 817* (HUA, VEN, NY). **Trujillo:** Distr. Carache, vía páramo Cendé sitio denominado "Las Cruces," *Rivero & Díaz 1486* (MO, NY).

**16. Elaphoglossum tripartitum** (Hook. & Grev.) Mickel, Brittonia 32: 116. 1980. Basionym: *Acrostichum tripartitum* Hook. & Grev., Icon. Filic. 1: tab. 118. 1829. *Acrostichum flabellatum* var. *tripartitum* (Hook. & Grev.) Baker, Syn. Fil. (Hooker & Baker) 416. 1868. *Rhipidopteris tripartita* (Hook. & Grev.) Fée, Mém. Foug. 2: 79. 1845. *Peltapteris tripartita* (Hook. & Grev.) C. V. Morton, Amer. Fern J. 45: 14. 1955. TYPE: Ecuador. Esmeraldas: 1660 m, s.d., *W. Jameson s.n.* (holotype, K!; isotype, E!). Figures 8O, P, 12.

*Rhipidopteris tripartita* var. *subbiternata* Hieron., Hedwigia 48: 273. 1909. TYPE: Ecuador. Pichincha: Mt. Pichincha, near Mindo, [00°20″S, 78°47″W], s.d., *M. A. Stübel 760* (holotype, B!).

Rhizomes 1–1.5 mm wide, long-creeping; rhizome scales 3–5.5 mm, appressed, lanceolate, entire or with a few small projections at base, light orange to brown, dull. Sterile leaves 2.5–8.5 cm; petioles 0.5 to 2.5 times the lamina length; petiolar scales 1–3 mm, slightly spreading, lanceolate or sometimes hastate, entire, brown; laminae 1.2–3 × 1.8–4 cm, about as long as wide, chartaceous, ternate to biternate, deltate, minutely crenulate on distal margins, apices broadly obtuse, bases cuneate; adaxial lamina surface sparsely scaly, the scales 0.5–1.5 mm, filiform (the body 2 or 3 cells wide) to hastate, light to dark brown, dull; abaxial lamina surface scaly, the scales 0.5–1.2 mm, lanceolate to hastate, light to dark brown, sometimes darker at point of attachment. Fertile leaves 4.5–7.5 cm; petioles 3 to 6 times the lamina length; laminae 1–1.5 × 0.8–1.4 cm, trilobed, apices rounded, bases truncate or short-decurrent; intersporangial scales 1–3 mm, lanceolate or hastate, brown.

*Distribution and elevation.* *Elaphoglossum tripartitum* occurs only on the western side of the Andes in northwestern Ecuador and has been collected from elevations of 1200–3200 m.

*Discussion.* *Elaphoglossum tripartitum* is the only species of *Elaphoglossum* sect. *Squamipedia* with ternate or (in large leaves) biternate laminae. The basal segments can themselves be tripartite at the apex. This distinctive laminar cutting makes this species one of the easiest to identify in the genus. The species also has filiform to hastate scales on the adaxial surfaces of the leaf laminae, a character that is shared only with *E. blepharis*.

*Elaphoglossum tripartitum* is a narrow endemic, being found only on the western slopes of the Andes near Quito. A form with somewhat more divided laminae was described from Mount Pichincha as *Rhipidopteris tripartita* var. *subbiternata* Hieron., but intergrades with the typical form and does not deserve nomenclatural recognition (Morton, 1955).

*Additional specimens examined.* ECUADOR. **Azuay:** above Sayausí at first bridge over Río Tomebamba, *Harling & Andersson 22685* (QCA). **Cotopaxi:** Reserva Otonga, entre Quito y Sto. Domingo ca. de San Francisco de las Pampas, *Nowicki 484*, *561* (QCA). **Imbabura:** Cantón Cotacachi, Parroquia García Mareno, cordillera de Toisán, cerro de la Plata, bosque protector Los Cedros, *Clark 7422* (NY); res. Los Cedros, cuchilla sur del río Los Cedros, sendero sobre la casa de Agapó hacia el Mirador, *Endara 259* (QCA). **Pichincha:** Cantón Quito, Río Guajalito Reserve, 10 km W of Chiriboga, Km. 59 on old rd. Quito–Santo Domingo, *Fay & Fay 3164* (AAU, MO, QCA, QCNE); rd. Santo Domingo–Quito, above Tandapi (Cornejo Astorga), *Holm-Nielsen et al. 7083* (AAU, MO, NY, UC); Res. Maquipucuna, sendero principal, *Vasco et al. 852* (NY, QCA).

## EXCLUDED SPECIES

*Elaphoglossum cardiophyllum* (Hook.) T. Moore, Index Fil. 7. 1857. Basionym: *Acrostichum cardiophyllum* Hook., Icon. Pl. tab. 715. 1845. TYPE: Ecuador. Pichincha: Quito, Andes, s.d., *W. Jameson 212* (holotype, K!; isotypes, BM!, LE, not seen).

*Elaphoglossum cardiophyllum* was previously placed in *Elaphoglossum* sect. *Squamipedia* by Mickel and Atehortúa (1980). It superficially resembles members of the section, such as *E. deltoideum*, in its long-creeping rhizomes, distichous leaf arrangement, and small leaves. But other morphological characters and chloroplast DNA evidence strongly support its placement in *Elaphoglossum* sect. *Elaphoglossum*, not *Elaphoglossum* sect. *Squamipedia* (Rouhan et al., 2004). The laminar scales have marginal processes that end in slightly swollen apical cells—as is typical of *Elaphoglossum* sect. *Elaphoglossum*. Furthermore, unlike other taxa of *Elaphoglossum* sect. *Squamipedia* that lack phyllopodia, *E. cardiophyllum* has phyllopodia present, as seen in other members of *Elaphoglossum* sect. *Elaphoglossum*. The perispore of *E. cardiophyllum* resembles that of species belonging to *Elaphoglossum* sect. *Elaphoglossum*; it is not echinulate as in *Elaphoglossum* sect. *Squamipedia* (Moran et al., 2007). *Elaphoglossum cardiophyllum* belongs to *Elaphoglossum* sect. *Elaphoglossum* (Rouhan et al., 2004).

*Elaphoglossum ovatum* (Hook. & Grev.) T. Moore, Index Fil. xvi. 1857. Basionym: *Acrostichum ovatum* Hook. & Grev., Icon. Filic. tab. 146. 1829. TYPE: Ecuador. Pichincha: Mt. Cayambe, 2133 m, s.d., *W. Jameson s.n.* (holotype, K!).

*Elaphoglossum ovatum* was previously placed in *Elaphoglossum* subsect. *Ovata* Christ in *Elaphoglossum* sect. *Squamipedia* by Mickel and Atehortúa (1980). However, molecular phylogenetic results have resolved this species in *Elaphoglossum* sect. *Lepidoglossa* (Rouhan et al., 2004).

*Elaphoglossum wrightii* (Mett. ex D. C. Eaton) T. Moore, Index Fil. 370. 1862. Basionym: *Acrostichum wrightii* Mett. ex D. C. Eaton, Mem. Amer. Acad. Arts n.s. 8: 194. 1860. TYPE: Cuba. Oriente: "prope Monte Verde," s.d., *C. Wright 965* (holotype, B!; isotypes, BM!, GH!, YU not seen). Figure 15F–J.

*Elaphoglossum wrightii* was previously placed in *Elaphoglossum* sect. *Squamipedia* by Mickel and Atehortúa (1980). This Cuban endemic greatly resembles members of that section in its long-creeping rhizomes, paired peglike aerophores, lack of phyllopodia, and small leaf size (Fig. 15F–J). However, unlike members of *Elaphoglossum* sect. *Squamipedia*, it lacks minute spines on the perispore (Moran et al., 2007). Our molecular phylogenetic study (Vasco et al., in prep.) using three noncoding chloroplast markers resolved this species outside sequenced accessions for *Elaphoglossum* sect. *Squamipedia*, and the species lies sister to the rest of the entire genus, except for *E. amygdalifolium* (Mett. ex Kuhn) Christ. Given this position on the tree, it is interesting to note in regard to the evolution of epiphytism that *E. amygdalifolium* and *E. wrightii* are the only hemiepiphytes in the genus. *Elaphoglossum amygdalifolium* starts growth on the base of tree trunks and then sends roots downward to the soil, with the stem growing only epiphytically (Lagomarsino et al., 2012); that is, it is a primary hemiepiphyte, sensu Benzing (1990). In contrast, individual plants of *E. wrightii* grow both terrestrially and epiphytically, first starting on the soil and then finding a tree to climb (Josmaily Lóriga, pers. comm.).

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APPENDIX 1. The Neotropical species of *Elaphoglossum* sect. *Squamipedia* and the countries (or islands) in which they occur.

1. *E. andreanum*: Colombia, Ecuador
2. *E. anthracinum*: Colombia, Ecuador
3. *E. blepharis*: Ecuador
4. *E. bryogenes*: Ecuador
5. *E. colombianum*: Colombia
6. *E. concinnum*: Ecuador, Peru
7. *E. deltoideum*: Ecuador
8. *E. feei*: Dominica, Guadeloupe
9. *E. lloense*: Bolivia, Colombia, Costa Rica, Ecuador, Panama, Peru, Venezuela
10. *E. minutum*: Bolivia, Brazil, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Peru, Venezuela
11. *E. moorei*: Bolivia, Peru
12. *E. nidiforme*: Bolivia, Ecuador, Peru
13. *E. peltatum*

13a. forma *flabellatum*: Bolivia, Colombia, Costa Rica, Ecuador, Guyana, Panama, Peru, Venezuela

13b. forma *peltatum*: Belize, Brazil, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Guadeloupe, Guatemala, Guyana, Haiti, Honduras, Jamaica, Martinique, Mexico, Nicaragua, Panama, Peru, Puerto Rico, Venezuela

13c. forma *standleyi*: Colombia, Costa Rica, Ecuador, Panama, Peru, Venezuela

14. *E. rhomboideum:* Colombia, Ecuador
15. *E. squamipes*: Bolivia, Brazil, Colombia, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Peru, Venezuela
16. *E. tripartitum*: Ecuador

APPENDIX 2. List of names. Accepted names are listed in boldface.

*Acrostichum cardiophyllum* Hook., see Excluded Species
*Acrostichum craspedariiforme* Fée = *Elaphoglossum squamipes*
*Acrostichum deltoideum* Sodiro = *E. deltoideum*
*Acrostichum feei* Bory ex Fée = *E. feei*
*Acrostichum flabellatum* Humb. & Bonpl. ex Willd. = *E. peltatum* f. *flabellatum*
*Acrostichum flabellatum* var. *bipartitum* Sodiro = *E. peltatum* f. *flabellatum*
*Acrostichum flabellatum* var. *tripartitum* (Hook. & Grev.) Baker = *E. tripartitum*
*Acrostichum lloense* Hook. = *E. lloense*
*Acrostichum minutum* Pohl ex Fée = *E. minutum*
*Acrostichum moorei* E. Britton = *E. moorei*
*Acrostichum peltatum* (Sw.) Sw. = *E. peltatum* f. *peltatum*
*Acrostichum peltatum* var. *potentillifolium* Christ = *E. peltatum* f. *flabellatum*
*Acrostichum flabellatum* var. *sphenophyllum* Kunze = *E. peltatum* f. *flabellatum*
*Acrostichum foeniculaceum* Hook. & Grev.
*Acrostichum ovatum* Hook. & Grev., see Excluded Species
*Acrostichum ovatum* Liebm. = *E. squamipes*
*Acrostichum rampans* Baker = *E. minutum*
*Acrostichum revolutum* Liebm. = *E. minutum*
*Acrostichum sphenophyllum* (Kunze) Kunze = *E. peltatum* f. *flabellatum*
*Acrostichum squamipes* Hook. = *E. squamipes*
*Acrostichum tripartitum* Hook. & Grev. = *E. tripartitum*
*Acrostichum wrightii* Mett. ex D. C. Eaton, see Excluded Species
**Elaphoglossum** sect. **Squamipedia** Mickel & Atehortúa
*Elaphoglossum* sect. *Squamipedia* subsect. *Feeana* Christ = *Elaphoglossum* sect. *Squamipedia*
**Elaphoglossum andreanum** Christ
**Elaphoglossum anthracinum** A. Vasco, Mickel & R. C. Moran
*Elaphoglossum bangii* Christ = *E. moorei*
**Elaphoglossum blepharis** A. Vasco, Mickel & R. C. Moran
**Elaphoglossum bryogenes** Mickel
*Elaphoglossum cardiophyllum* (Hook.) T. Moore, see Excluded Species
**Elaphoglossum colombianum** (Maxon) Mickel
**Elaphoglossum concinnum** Mickel
*Elaphoglossum craspedariiforme* (Fée) Brade ex Alston = *E. squamipes*
**Elaphoglossum deltoideum** (Sodiro) Christ
*Elaphoglossum elegantulum* Rosenst. = *E. minutum*
*Elaphoglossum ensiforme* Mickel = *E. lloense*
**Elaphoglossum feei** (Bory ex Fée) T. Moore
*Elaphoglossum flabellatum* (Humb. & Bonpl. ex Willd.) Christ = *E. peltatum* f. *flabellatum*
*Elaphoglossum foeniculaceum* (Hook. & Grev.) C. Chr.
**Elaphoglossum lloense** (Hook.) T. Moore
*Elaphoglossum macilentum* Mickel = *E. minutum*
**Elaphoglossum minutum** (Pohl ex Fée) T. Moore
**Elaphoglossum moorei** (E. Britton) Christ
**Elaphoglossum nidiforme** Mickel
*Elaphoglossum ovatum* (Hook. & Grev.) T. Moore, see Excluded Species
**Elaphoglossum peltatum** (Sw.) Urb.
  forma **flabellatum** (Humb. & Bonpl. ex Willd.) Mickel
  forma *foeniculaceum* (Hook. & Grev.) Mickel = *E. peltatum* f. *flabellatum*
  forma *potentillifolium* (Christ) Mickel = *E. peltatum* f. *flabellatum*
  forma **standleyi** (Maxon) Mickel
*Elaphoglossum peruvianum* (L. D. Gómez) Mickel = *E. moorei*
*Elaphoglossum rampans* (Baker) Christ = *E. minutum*
*Elaphoglossum revolutum* (Liebm.) T. Moore = *E. minutum*
**Elaphoglossum rhomboideum** A. Vasco, Mickel & R. C. Moran
*Elaphoglossum rhynchophyllum* Christ = *E. lloense*
*Elaphoglossum serpentinum* A. Rojas & W. D. Rodríguez = *E. lloense*
**Elaphoglossum squamipes** (Hook.) T. Moore
*Elaphoglossum subaequale* T. Moore = *E. squamipes*
*Elaphoglossum teleglottis* Mickel = *E. lloense*

**Elaphoglossum tripartitum** (Hook. & Grev.) Mickel

*Elaphoglossum wrightii* (Mett. ex D. C. Eaton) T. Moore, see Excluded Species

*Elaphoglossum xiphoides* Mickel = *E. minutum*

*Elaphoglossum* sect. *Squamipedia* subsect. *Peltapteris* (Link) Mickel & Atehortúa = *Elaphoglossum* sect. *Squamipedia*

*Microstaphyla bangii* (Christ) Hieron. = *E. moorei*

*Microstaphyla colombiana* Maxon

*Microstaphyla moorei* (E. Britton) Underw. = *E. moorei*

*Osmunda peltata* Sw. = *E. peltatum* f. *peltatum*

*Peltapteris* Link = *Elaphoglossum* sect. *Squamipedia*

*Peltapteris colombiana* (Maxon) L. D. Gómez = *E. colombianum*

*Peltapteris flabellata* (Humb. & Bonpl. ex Willd.) C. V. Morton = *E. peltatum* f. *flabellatum*

*Peltapteris flabellata* f. *standleyi* (Maxon) C. V. Morton = *E. peltatum* f. *standleyi*

*Peltapteris foeniculacea* (Hook. & Grev.) L. D. Gómez = *E. peltatum* f. *flabellatum*

*Peltapteris moorei* (E. Britton) L. D. Gómez = *E. moorei*

*Peltapteris peltata* (Sw.) C. V. Morton = *E. peltatum* f. *peltatum*

*Peltapteris peltata* f. *flabellata* (Humb. & Bonpl. ex Willd.) L. D. Gómez = *E. peltatum* f. *flabellatum*

*Peltapteris peltata* f. *foeniculacea* (Hook. & Grev.) C. V. Morton = *E. peltatum* f. *flabellatum*

*Peltapteris peltata* f. *potentillifolia* (Christ) C. F. Reed = *E. peltatum* f. *flabellatum*

*Peltapteris peruviana* L. D. Gómez = *E. moorei*

*Peltapteris tripartita* (Hook. & Grev.) C. V. Morton = *E. tripartitum*

*Rhipidopteris* Schott ex Fée = *Elaphoglossum* sect. *Squamipedia*

*Rhipidopteris flabellata* (Humb. & Bonpl. ex Willd.) Fée = *E. peltatum* f. *flabellatum*

*Rhipidopteris peltata* (Sw.) Schott ex Fée = *E. peltatum* f. *peltatum*

*Rhipidopteris rusbyi* Christ = *E. moorei*

*Rhipidopteris sphenophylla* (Kunze) Fée = *E. peltatum* f. *flabellatum*

*Rhipidopteris standleyi* Maxon = *E. peltatum* f. *standleyi*

*Rhipidopteris tripartita* (Hook. & Grev.) Fée = *E. tripartitum*

*Rhipidopteris tripartita* var. *subbiternata* Hieron. = *E. tripartitum*

APPENDIX 3. List of exsiccatae reviewed. Collector names are organized alphabetically; collector numbers in boldface refer to types. The number in parentheses refers to the species (infraspecies) number assigned in this monograph. Only the first collector's name is given for accessions with multiple names.

**Abbott** 1853 (13b); **Aceby** 490, 566, 761 (10); **Acevedo-Rodríguez** 13844 (13b); **Aguilar** 4510 (15), 5382 (13b); **Albert de Escobar** 6000 (9); **Alfaro** 523 (13a), 610, 1161 (15), 4456, 5608 (13b); **Allard** 22122 (13b); **Allen** 15275, 15409, 503, 508 (13b), 1260 (13c), 1951 (10); **Almeda** 5807 (13b); **Alston** 161 (13b), 6472 (9), 6982 (13a), 7201 (15), 7660 (13b), 8187 (13a), 8212 (13b), 8235 (14), 8375 (9); **Anderson** 3271, 3300 (13b); **André** **3114** (1), 186, 1185 (13b), 2557, 3381 (13a); **Angulo** 364 (13c); **Ankersen** 174 (13b); **Araquistain** 2611 (13b); **Arbeláez** 922 (9); **Argent** 94 (13b); **Arias** 0135 (9); **Asplund** 8709 (16), 19710 (13c); **Atehortúa** 1065, 1071 (9); **Atwood** 3913 (13b); **Axelrod** 3237 (13b); **Aymard** 2444 (13b).

**Bach** 1650, 1881 (9); **K. Baker** 13961 (13c); **M. A. Baker** 5771 (13c); **H. Balslev** 3143 (16), 3230, 4688, 4739 (13b), 60594 (10); **Bang** **558** (11), 1791 (15); **Barclay** 5969 (1), 9451 (13b), 9453 (13c); **Barfod** 41358 (13b), 48608, 48763 (13a); **Barkley** 40047, 40355 (13b); **Barreto** 8851 (13b); **Barrington** 496 (9); **Bartholomew** 3326, 3327 (13b); **Beck** 1426 (9), 24667 (11); **Beitel** 85271 (13b); **Bell** 662 (16), 665 (9); **Berlin** 445 (13b); **Betancourt** 179 (13b); **Bittner** 104, 107, 148 (15), 2585 (9); **Blomquist** 12746 (13b); **Boeke** 1015 (13b); **Bøgh** 47860 (9); **Bohs** 1825 (13b); **Boom** 7460 (13a), 7497 (13b), 9195 (13a); **Bourgeau** 3158 (13b); **Boyle** 5975 (13b); **Brade** 97, 166 [HB no. 9813] (13b), 194 (13a), 5290, 6447, 15206 (15), 15379 (10), 15531, 16472, 20830, 21270 (15); **Brandbyge** 30577 (10), 42881 (15); **Breedlove** 21662 (13b), 22733 (15), 27432, 27432 (10); **Brenes** 4025 (13a), 14201 (13b), 15077 (13c), 15153 (13b), 16131 (13a), 16137, 21237 (13b), 22420 (13a); **E. G. Britton** 974, 2664 (13b); **N. L. Britton** 2161, 2480, 6187, 7593 (13b); **Brown** 17828 (13b); **Bryan** 526 (15); **Buchtien** 5297 (11); **Bües** A41, **1572** (11); **Burger** 5680, 5807 (13b), 7374 (15).

**Callejas** 5076, 9148 (13b); **Calzada** 8341, 8805 (13b); **Camp** E-810 (13b), E-2882 (15), E-3419 (7); **Campos** 1713 (13b); **Campos-Porto** 2645 (13b); **Carlson** 3360 (13b); **Carter** 5251 (13b); **Casal** 28a (13b); **Casañas** 233 (13a), 252 (13b); **Cayola** 2847 (11); **Cazalet** 5180 (13b), 5479 (15); **Cedillo** 3321 (13b); **Cerón** 6465 (13a), 17303 (13b); **Cházaro** 6791 (15); **Christenhusz** 4171 (8), 5400 (13b); **Chrysler** 1802, 4902 (13b); **H. Churchill** 4839 (13a), 4840, 5865 (13b); **S. P. Churchill** 16890, 18340, 18341 (13b); **Clark** 3634, 7513 (13a), 4505pp (16), 4505pp (13b), 7422 (16), 12471 (13b); **Clarke** 4963 (10); **Cleef** 7839 (1); **Clute** 83 (13b); **Cogollo** 2917 (13c); **Condack** 250, 318 (15); **Correa** 8044 (13c), 8213 (13b), 8577 (13c), 8578 (13b), 8586 (13a); Cotton A1546 (6); **Couthouy** 26 (16); **Croat** 39143 (13b), 40328 (10), 47349 (15), 54442 (9), 60433 (13c), 60591A, 63771, 64055 (13b), 68139, 68171 (13c), 70389 (13b), 73680 (7), 100818 (13c); **Cuatrecasas** 11911 (1), 12863, 12998 (13b); Curran 5 (13b).

**Daly** 13117 (13b); **Danin** 76234 (13b); **Davidse** 23878 (15), 24572 (10), 24575 (13b), 24914, 25269, 25834 (15), 35362, 35900, 35975, 36200, 36767, 37298 (13b); **Davidson** 746 (10); **de Avila** 728, 728 (13b); **deWolf** 353 (13b); **C. Díaz** 7565 (13b), 9669 (15); **S. Díaz** 1306 (13b); **Dodge** 4517, 16998 (13b); **Dodson** 7429, 7581 (13b), 10685 (15), 10770 (16), 10815 (9), 10928, 12016, 14166 (13b); **Dorr** 7301, 7402, 8249 (9); **Dressler** 86 (10), 154, 1604 (13b); **Dudley** 10490 (11); **Duke** 13225, 13847 (13b); **Duque** 162 (1); **A. Duss** 4135 (8); **P. Duss** 1617, 4147 (13b); **Dwyer** 492 (13b), 8708 (10).

**Eberhardt** 100, 348, 593 (9), 598 (13a); **Echeverri** 152 (9); **Ekman** 4618, 5337, 6757, 8858, 11835, 14375 (13b), 14764 (10); **Endara** 259 (16); **Engel** **118** (9); Engelmann RE231 (15); **Eriksen** 59211 (15), 91224, 91224 (9); **Espinoza** 53 (13b); **Esseichick** 117, 118 (13b); **Estrada** 1850 (13a); **Evans** 90 (15).

**Fagerlind** 713 (13b), 1255 (13c); **Fay** 1455 (13b), 3164, 3177, 3232, 3344 (16), 3604 (13c); **Fendler** 263 (13c), 286 (9), 361, 278 (13b); **Fernándes-Alonso** 24771 (13b); **A. Fernández** 1433 (15); **E. Fernández** 2078, 2078 (9), 2419 (11), 2537, 2626 (9), 3110 (11), 3484, 3498 (9); **A. Fernández-Pérez** 5352, 5439, 5491 (13b); **Figueroa** 70 (13b); **Filskov** 37096 (16); **Fink** 109 (13b); **Fisher** 98 (13b); **Folsom** 6677 (13a); **Fonnegra** 1966 (13b); **Forero** 2709, 5067 (13b); **Foster** 7763 (11), **10891** (12), 10894 (13a), **11978** (10); **Franco** 1183 (13b), 1259, 1869, 2159 (13a), 2883 (9); **Freire** 3011 (15); **Fryxell** 2553 (13b); **Fuentes** 8829, 11706 (11); **Fuertes** 516, 1088 (13b).

**Galeano** 3703 (13b); **Gamboa** 995, 1159, 1302 (15); **Gastony** 240, 624 (13b); **Gavilanes** 848 (1); **Gentry** 24416 (13b), 26546 (13a); **Ghiesbreght** 397 (13b); **Giraldo-Cañas** 379 (13b); **Gittins** 4155, 4226 (13b); **Glassman** 2109 (13b); **Glaziou** **3550** (15); **A. Gómez** 685 (5); **L. D. Gómez** 21843 (15); **Gómez-Dominguez** 1019 (13b); **F. González** 3116 (14); **M. F. González** 579 (13b); **M. L. Grant** 9809 (13b), 9815 (13a), 10210 (9); **V. Grant** 863 (13b); **Grayum** 4993 (13c), 7101 (13b), 7431 (15); **Grijalva** 595, 1211 (13b); **Grubb** 1293 (13b), 1309 (9), 1320 (13a), 1340 (9).

**Haber** 2870, 5193 (13b), 8536, 9563 (13a); **Hagemann** 660 (9), 1359 (1), 1543 (13b), 1846, 1997 (9); **Hahn** 701 (13b); **Hallberg** 1436, 1514, 1726 (13b); **Hamilton** 4122 (13c); **Hammel** 7477 (13b), 17461 (13a); **Harling** **18092**, 22455 (3), 22685 (16); **Harris** 7490, 10125 (13b); **Hartley** 13337 (13b); **Hatch** 88 (13b); **Haught** 4494, 4638 (13b), 5234 (13a); **Hauke** 217, 476 (13b), 477 (13c); **Hawkins** 529 (13b); **Hazlett** 8017 (13b); **Heinrichs** 826 (15); **Henipam** 6719 (13b), 6878 (13a); **Henrich** 206, 411 (13b); **Herrera** 1026, 3176 (13b); **Hess** 218, 2802 (13b); **Heyde** 3216 (13b); **Hill** 13, 17848 (13b); **Hinton** 10756, 14273 (13b); **Hodge** 22 (8), 1784 (13b), 2297, 2790 (8), 2803 (13b), 6630 (9), 6986 (13b); **Holdridge** 771, 799, 799, 1592 (13b); **Holm** 191 (13b); **Holm-Nielsen** 425, 532 (13c), 1365 (7), 2915, 2944, 3035, 4099a (13b), 5657 (9), **6168** (14), 7083, 18151, 18422, 24796 (16), 41810 (1); **Holst** 3894, 5517, 5700 (13b); **Hoover** 1611, 1614 (13a), 2897 (9); **Horich** 428 (15); **House** 1129 (15); **Howard** 8542, 12289, 16016 (13b); **Huertas** 5928 (1); **Hunnewell** 14609 (15); **Hutchison** 4753, 5825 (15).

**Idrobo** 979, 1102, 1490 (13b), 2992 (1); **Iltis** 483, 2229a (13b).

**James** 1973316 (13b); **Jameson** 2 (13b), 32 (13a), 44 (16), 108, 137 (13b), 207 (16), 451 (9); **Janovec** 1419, 1421 (13b); **J. Jaramillo** 7960 (16); **N. Jaramillo** 678 (13b); **Jaramillo-M** 3072, 3678 (15), 3773 (9), 3874 (13b), 5171 (1), 5355 (15), 5919, 5973 (1), 6381 (15), 7194 (13b), 7430, 7432, 7561 (9); **A. Jiménez** 401 (13b); **I. Jimenez** 2289 (10), 701 (11), 1242, 2151 (9), 2191, 2274 (12), 2888 (15); **Jones** 1020, 3268 (13b); **Jordán** 338, 373 (9).

**Kerr-Valentic** 73 (9); **Kessler** 6561, 6664 (9), 6742 (15), 6961 (11), 7078 (11-hybrid?), 7280, 7389, 7536 (9), 7689, 7689, 7948 (12), 8300 (10), 9137, 9418, 9502, 9548 (9), 10944 (10), 11319 (9), 11690 (12), 11808, 11846, 12057 (9), 12171 (11), 12172, 12947 (9); **Killip** 9012 (13a), **11365** (5), 11618 (13b), 11619 (13a), 17748 (15), 17867 (1), 20095 (13b), 22781, 23206 (13a), 26016, 33161, 38909 (13b); **King** 7695 (11); **Kirkbride Jr.** 1925, 2127 (13a), 2136 (13b); **Knight** 686, 1155 (13b); **Köster** 871 (10); **Krömer** 2838 (13b), 2873 (10); **Kunkel** 632 (13a).

**Labiak** 1253 (15), 2855 (9); **Laegaard** 51596B, 51616, 51668 (13b), 54626 (16); **LaFrankie** 1024 (13b); **Larsen** 35385 (13b); **Lehmann** 1041 (13a), 3641 (14), 4928 (1), 6949 (15), 7405 (9), 7658 (6); **Lehnert** 384 (11-hybrid?), 1253 (13b), 1254 (13a), 1316 (12), 1409 (6), 1424 (9), 1460, 1463 (1), 1491 (9), 2259 (15), 2309 (9); **Lellinger** 96, 547 (13b), 633 (8), 1961 (15); **Lems** 650203 (13b), 64012702-6 (13a); **Lent** 30, 702 (13b), 717 (15), 3699 (13c); **León** 10401, 12034 (13b); **Leonard** 14555 (13b); **Lesica** 4157 (13b); **Lewis** 293 (13b); **Liebmann** 86 (13b), 2427 (10); **Liesner** 9924, 16908, 17717 (13b), 21548 (13a), 21661, 25064, 25076, 25385, 26619, 26629 (13b); **Lindig** 270 (13c); **Liogier** 19916, 21650 (13b); **Little** 9377 (9); **Lloyd** 150 (8), 348 (13b), 890 (8), 925, 4209 (13b), 4276 (15); **Løjtnant** 12069 (1), 14038 (16); **Lorea** 1920, 3168 (13b); **Lozano** 3489 (2), 4684 (1); **Luer** 8682 (9); **Lugo** 1791 (13b); **Luteyn** 6117 (15), 8245 (9), 10693, 10745 (13b), 10765 (13a), **11002** (2), 12248 (5), **14682** (4).

**Mabride** 3359, 4024 (15); **MacDougal** 3970 (13a), 3971 (13b); **Madison** 650 (13b), 2514, 3313 (13c), 7099 (13a); **Madsen** 75899 (13a); **Maguire** 27748, 29939, 33482, 33874, 36873, 36979 (13b); **Martin** 3766 (13b); **Martínez** 444 (13b); **Martínez-Meléndez** 1152 (13b); **Martínez-Salas** 18661, 23981 (10), 28474 (13b); **Matos** 328, 1330, 1584 (13b); **Matuda** S-210, 5122 (13b); **Maxon** 220, 233, 778, 828, 1551, 5219 (13b), 5286, 5327 (15), 7794 (13b), 8251 (13a), 8273 (13b); **Maya J.** 1989, 3988 (13b); **McPherson** 7797 (13b), 9529 (13a), 11164 (13b), 12144 (13c), 15909, 15925 (13b); **McVaugh** 13925, 21333, 21443 (13b); **Meier** 10307 (13b); **Mejía** 4980, 9092, 18355 (13b); **Mellado** 2680 (15), 2767, 2981 (9), 3018 (11), 3026 (9); **Méndez** 7833, 7931 (13b); **Mendieta** 162, 665 (9); **Merello** 2741 (13c); **Mexia** 7023A, 8456, 9264 (13b); **Mickel** 1538, 1901, 2364, 2365, 2489, 2490, 2556 (13b), 2579 (13a), 2580 (13b), 2685 (13a), 2713, 2794, 2827 (13b), 2915 (13c), 2950 (13a), 3024 (13b), 3213 (15), 3280 (13a), 3356, 3446, 3485, 3602 (13b), 3604, 3623 (13a), 3770, 3807, 3808, 4267 (13b), 4337, 4587, 4649 (15), 4691 (13b), 4897, 5266 (15), 5568, 5579, 5590, 5685, 5908, 6452, 6563, 6607, 6742, 6765, 7044, 7088, 7249 (13b), 7326 (10), 8031, 8535 (13b), 8601 (10), 8884, 8956, 9133, 9199, 9703 (13b); **Mille** 200 (9); **Molau** 2219 (16); **Molina** 16850 (13b), 21313 (15); **Molseed** 314 (13b); **Monro** 4165 (15); **Monsalve** 1479, 1798, 1833, 2108 (13b); **Montalvo** 4812 (15); Moore 9721 (13b); **Mora** 4257 (13a); **Mora-Castro** 27, 253, 273 (13b), 1836 (13c); **Moran** 2362 (15), 3182 (13c), 3290, 3311, 5556 (13b), 5643 (15), 5695 (13b), 6206 (10), 6308 (15), 6446 (13b), 6783 (16), 6867 (1), 6951, 7565 (13b); **Moreno** 1125, 1349, 1838, 9576, 16511, 17049, 19248, 24350 (13b); **Mori** 3984, 3998 (13c); **E. Moritz** 258 (9); **J. W. K. Moritz** 313 (13a); **Morton** 3382 (10), 3765 (13b); **Mostacero** 325, 326, 355, 506 (10); **Müller** 39 (15); **Munn-Estrada** 1753 (13b); **Murrill** 37 (13b).

**Navarrete** 397 (1), 774 (16), 1302, 1334, 1356, 1380 (15), 1438 (1), 1533 (9), 1578 (13b), 1644, 3093 (9); **Navarro-V.** 352 (10); **Nee** 24657, 27922 (13b); **Neill** 863, 3491 (13b); **C. H. Nelson** 8021 (13b); **E. W. Nelson** 3351 (13b); **Nicolson** 1921 (13b), 4077 (8); **Nowicki** 113, 484, 561, 913 (16); **Núñez** 51, 306, 404, 537, 649 (9).

**Ohba** 75 (13b); **Øllgaard** 987 (13b), 1185 (15), 1222 (9), 1433 (13c), 1592, 1610, 1672, 2049A, 2077 (9), 2241 (13a), 2253 (13b), 2658, 2700 (9), 2797 (1), 2858 (13a), 3050 (9), 8306 (14), 8334 (9), 9054 (13c), 9530, 34364 (1), 35600 (13c), 35936 (4), 37649, 37754 (13b), 37755pp (13a), 37755pp (13b), 38174 (9), 38189 (15), 38623, 38768, 38807 (1), 38852 (10), 57343 (13a), 57380 (13b), 57642 (13c), 74480 (9), 74861 (13a), 75008 (9), 90336 (1), 90658 (9), 91139 (6), 98068 (13a), 98437 (13b), 98682 (13c), 99199 (16), 99983 (13b), 99984 (13a), 105519, 105589 (9), 105643 (13b), 105660, 105675, 105796 (9); **Orozco** 2164 (13b), 2165 (13a); **Ortega** 1203 (13b), 2356 (13a).

**Paguaga** 19 (13b); **Palacios** 6482 (13b), 11838 (1); **Palacios-Rios** 2313 (13b); **Palmer** 49 (13b); **Patzi** 102, 505, 506 (9); **Penland** 651 (9); **Pennell** 4486, 4507 (13b); **Perea** 2951 (13a); **Pérez** 2702 (13c); **Perez-Arbelaez** 237 (13a); **Perkins** 1208 (13b); **Persaud** 117 (13b); **Peyton** 811, **814**, 1100 (9); **Pfeiffer-Berendsohn** 27, 49 (13b); **Philipson** 1845 (13b); **Pipoly** 5321 (13b); **Pimelkese** 1367 (6); **Pimentel** 1145 (13b); **Pittier** 30 (10), **704** (13a); **Plowman** 5378 (13a); **Pohl** 1432 (10); **Prance** 29196 (13b); **Prescott** 1259, 1448 (16); **Pride** 136, 202 (13b); **Pringle** 10304, 13291

(13b); **Proctor** 20311 (8), 21735 (13b), 22170 (10), 40076 (13b); **Purpus** 1993 (13b).

**Questel** 2717, 3267 (8); **Quijada** 121 (13b); **Quirós** 255 (13b).

**Ramírez** 2822 (1), 3848 (9), 4721 (1); **Ramos** 6629, 6629, 6669, 6669 (15); **Ramos-Pérez** 1063, 1103, 1139 (5); **Ray** 2125 (13b); **Reynoso-Santos** 607 (13b); **Riina** 970 (15); **Rimbach** 7 (15); **Rivera** 696 (13c); **Rivero** 1486 (15); **J. Rodríguez** 292 (13b); **W. D. Rodríguez** 4094 (13b), 4692 (1), 4865, 4872, 4988, 5183 (9), 5623 (13a), 9042 (13b); **A. F. Rojas** 1421 (13c), 1704, 1826, 1890, 1952 (13b), 2032, 2082 (13c), 2323, 2380 (13a), 2559 (13b), 2595 (13c), 2618 (13a), 2853 (15), 2896, 3011, 3031 (13b), 3096 (10), 3185 (13b), 3197 (15), 3892 (13c), 3893 (13b), 3965 (13c), 4039 (13b), 4079, 4278 (13c), 4350 (9), 4354 (10), 4662 (15), 4806, 4850 (13b), 4851 (13a), 4892 (10), 4923 (9), 4961 (13b), 5053 (13c), 5054, 5476 (13b); **R. Rojas** 548 (13b), 2052, 3271 (9); **Rossbach** 3186, 3683 (13b); **Rovirosa** 848 (13b); **Rubio** 2150 (13b); **Rudolph** 113 (16); **Rueda** 4384, 5028, 5124, 5802, 6474, 6934, 7185, 8362, 9701, 10690, 11277, 11724, 14549, 15532, 15670, 16967 (13b); **Ruhfel** 4 (13b); **Ruiz-Terán** 655 (13b); **Rzedowski** 118 (15), 126, 18618 (13b).

**Sagastegui** 5932 (13b); **Salazar** 9297 (13a); **Salino** 6510 (15); **Salvin** 317 (10); **C. Sánchez** 177, 183 (13b); **D. Sánchez** 374 (13a); **Santa** 800 (13b); **Scamman** 5988 (15), 5996 (10), 6008, 6009, 6010, 6545, 7148, 7149, 7150, 7151, 7480, 7685, 7686, 8002, 8003, 8004 (13b); **Schipp** S-795 (13b); **Schultes** 789, 877 (13b), 20100 (1); **Schunke-Vigo** 3047 (13b); **Schwacke** 14180 (15); **Seibert** 173 (13b); **Seidenschnur** 243, 249 (15); **Seiler** 97 (13b), 149, 745 (15), 850, 993, 1661 (13b); **Seymour** 3088 (13b); **Shafer** 3218, 3589, 4461, 8089, 9021 (13b); **Silva** 60851 (13b); **Silverstone-Sopkin** 2954 (9); **Sinten** 4539 (13b); **Sipman** 27574 (13a); **Skog** 5039 (13a); **Skutch** 957, 2772, 3132, 5230 (13b); **A. R. Smith** 1004, 1454, 1644 (13b), 2050 (15), 2097 (13b), 2220 (13c), 2308 (13b); **C. L. Smith** 2156 (13b); **D. N. Smith** 1635 (11), 1711, 2605, 5310 (13a), 5959 (13b), 5960 (13a), 6671, 6772 (13b), 7858 (11), 8164 (15), 8518 (11); **H. H. Smith** 1042 (13b), 2673 (10); **Sohmer** 9627 (13b); **Solheim** 1237 (13b); **Solomon** 14929 (9); **Somers** 229 (13b); **Sperling** 5018 (13a), 5018A (13b); **Spruce** 4635 (13a), 5226 (13b); **Stancik** 2978 (1); **Standley** **36464** (13c), 41641, 47789 (13b), 58771, 60956 (15); **Steeves** 486 (13b); **Stehlé** 652, 1120, 1211, 1420, 1767, 1782, 1791, 2406 (8); **Steinbach** 5870, 9211 (9), 9301 (11); **Stergios** **10310** (10), 20664, 20728 (9); **Stern** 205 (13b); **Stevens** 4357, 4867, 5037, 11534, 11744, 12052, 12166, 15257, 16279, 16474, 18683 (13b); **Steyermark** 897, 30515, 32470, 38277 (13b), 44457, 45613 (10), 47414 (13b), 49613 (10), 52964 (9), 56334, 58694, 59580, 75015, 75661, 75661, 89823 (13b), 89850 (9), 96335, 98949, 100452, 103394 (13b), 105673 (13a), 114074 (13b), 118353 (9), 118993, 124043, 126574 (13b), 126785 (13a), 130651 (13b); **Stimson** 1628 (13b); **Stork** 4812 (13b); **Stübel** **760** (16); **Suin** 409 (16); **Sundue** 660 (9), 1688 (15); **Sylvestre** 180, 1878 (15).

**Tamandaré** 482 (15); **Tate** 505 (13b); **J. Taylor** 4611, 11269, 11804 (13b), 11943 (13c), 17469, 17779 (13b), 17984 (13c); **N. Taylor** 539 (13b); **Téllez** 7142 (13b); **Tenorio** 14278, 14728, 15543 (13b); **Ton** 2815 (13b); **Torres** 1908 (13b); **Treiber** 204 (15); **Tryon** 6996, 7020 (13b), 7060 (13a).

**Underwood** 1265, 1674, 2610 (13b); **Uribe** 6415 (13b).

**Valenzuela** 3082 (11), 9124 (15); **Valerio** 759 (13b); **Valeur** 348 (13b), 640 (10); **Van Cotthem** 1360 (13b); **van der Werff** 5962 (15), **6503** (9), 9054 (6), 10621 (1), 16901 (15), 19596, 21197 (9), 21420 (11), 5032 (13b), 9726 (5), 19879, 21079 (11), 21437 (11-hybrid?), 21477 (11); **Vargas** 6786 (13a), 10669 (11), 16733 (13c); **Vasco** 445 (9), 452 (13a), 459 (13b), 512, 539 (9), 622, 636 (5), 646 (9), 759 (15), 779 (9), 817 (15), 845 (9), 852 (16), 855 (13b), 865 (9), 867 (16); **Vásquez** 29558 (13b), 29951 (9), 30126 (11-hybrid?), 30128 (9), 30581, 31008 (11); **Velasco** 33 (13b); **Vélez** 1820 (15), 4206 (1); **E. Ventura** 3965 (13b); **F. Ventura** 13637 (13b); **von Sneidern** A.38 (13b), 624 (13a); **von Türckheim** 157, 159 (10), II.1022 (13b), 11159 (10), 2946 (13b).

**Wacket** 156, 301 (15); **Wagner** 77055 (13a), 78631 (13c); **Warner** 298 (13b); **Warrington** 8 (13b); **Weber** 6071, 6111 (13b); **Webster** 240 (10), 13340 (8), 16595 (15); **Weigend** 5755, 5756 (13a); **Wendt** 5185 (13b); **Werling** 418 (13b); **Werner** 466 (12), 687 (13b), 688 (13a), 2422 (9); **Wessels-Boer** 1994 (13b); **Wiggins** 10423 (1); **Wilbur** 10321, 10519 (13b); **L. O. Williams** 11434, 16602, 23461 (13b), 24575 (13c), 25734 (13b); **R. S. Williams** 504, 899 (13b); **Wilson** 76 (13b); **Windisch** 1135 (13c), 1136 (13b); **Wingfield** 6560, 6586 (13b); **Woodson Jr.** 765 (10), 958 (15), 1177 (10), 1252 (13b); **Woytkowski** 8297 (13a); **Wright** 927 (13b), 968, 1071, **3959** (10); **Wurdack** 692 (15).

**York** 184, 184 (13b); **Young** **1301** (6), 1997 (15); **Yuncker** 1125, 6194 (13b), 6440 (10), 18489 (13b).

**Zamudio** 8466 (13b); **Zanoni** 17470, 18869, 20044, 21299, 22620, 22699, 27128, 33996, 36857, 41035, 41983, 42777 (13b); **Zarucchi** **6484** (9).

Appendix 4. Distribution by country (or island) for the taxa of *Elaphoglossum* sect. *Squamipedia*. Endemic species are in boldface. The number of taxa per locality appears in parentheses.

Belize (1): *E. peltatum* f. *peltatum*

Bolivia (6): *E. lloense*, *E. minutum*, *E. moorei*, *E. nidiforme*, *E. peltatum* f. *flabellatum*, *E. squamipes*

Brazil (3): *E. minutum*, *E. peltatum* f. *peltatum*, *E. squamipes*

Colombia (10): *E. andreanum*, *E. anthracinum*, ***E. colombianum***, *E. lloense*, *E. minutum*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*, *E. peltatum* f. *standleyi*, *E. rhomboideum*, *E. squamipes*

Costa Rica (6): *E. lloense*, *E. minutum*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*, *E. peltatum* f. *standleyi*, *E. squamipes*

Cuba (2): *E. peltatum* f. *peltatum*, *E. minutum*

Dominica (2): *E. feei*, *E. peltatum* f. *peltatum*

Dominican Republic (2): *E. minutum*, *E. peltatum* f. *peltatum*

Ecuador (15): *E. andreanum*, *E. anthracinum*, ***E. blepharis***, ***E. bryogenes***, *E. concinnum*, *E. deltoideum*, *E. lloense*, *E. minutum*, *E. nidiforme*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*, *E. peltatum* f. *standleyi*, *E. rhomboideum*, *E. squamipes*, ***E. tripartitum***

El Salvador (2): *E. peltatum* f. *peltatum*, *E. squamipes*

Guadeloupe (2): *E. feei*, *E. peltatum* f. *peltatum*

Guatemala (3): *E. minutum*, *E. peltatum* f. *peltatum*, *E. squamipes*

Guyana (3): *E. minutum*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*

Haiti (1): *E. peltatum* f. *peltatum*

Honduras (2): *E. minutum*, *E. peltatum* f. *peltatum*

Jamaica (2): *E. minutum*, *E. peltatum* f. *peltatum*

Martinique (1): *E. peltatum* f. *peltatum*

Mexico (3): *E. minutum*, *E. peltatum* f. *peltatum*, *E. squamipes*

Nicaragua (1): *E. peltatum* f. *peltatum*

Panama (6): *E. lloense*, *E. minutum*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*, *E. peltatum* f. *standleyi*, *E. squamipes*

Peru (9): *E. concinnum*, *E. lloense*, *E. minutum*, *E. moorei*, *E. nidiforme*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*, *E. peltatum* f. *standleyi*, *E. squamipes*

Puerto Rico (1): *E. peltatum* f. *peltatum*

Venezuela (6): *E. lloense*, *E. minutum*, *E. peltatum* f. *flabellatum*, *E. peltatum* f. *peltatum*, *E. peltatum* f. *standleyi*, *E. squamipes*